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Replacement sheets should be substituted for the following pages:

(1) Table of Contents (Pages v-vii)
(2) Add Pages viii-ix
(3) Language Arts (Pages 149-150, 152(i) and 152(xiv))
(4) Second Languages (Pages 163, 164(viii) to (xii))
(5) Mathematics (Pages 170(i) to 172)
(6) Science (Pages 191, 198 to 203, 212, 214)
(7) Social Studies (Pages 234 to 239)

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TABLE OF CONTENTS

Page

Developing Desirable Personal Characteristics viii
Religious Instruction ix

Goals of Basic Education 1

1. Art 3
   Art 10 4
   Art 20 5
   Art 21 6
   Art 30 7
   Art 31 9

2. Business Education Program 12
   Accounting 10 15
   Accounting 20 16
   Accounting 30 17
   Business Foundations 10 and 30 19
   Business Machines 30 21
   Data Processing Program 22
      Data Processing 20 23
      Computing Science 30 25
   Law 20 28
   Law 30 33
   Marketing Program 36
      Marketing 20 37
      Marketing 30 38
   Procedures Program 43
      Business Procedures 20 43
      Office Procedures 30 46
   Record Keeping 10 49
   Shorthand 50
      Shorthand 20 51
      Shorthand 30 52
      Shorthand 31 53
   Typewriting Program 56
      Typewriting 10 57
      Typewriting 20 58
      Typewriting 30 60

3. Drama 62
   Initial Level (Grades 7 and 8) 63
   Intermediate Level (Grade 9 and Drama 10) 64
   Advanced Level (Drama 20 and 30) 66
   Extension of Program for Drama 10 66
   Extension of Program for Drama 20 68
   Extension of Program for Drama 30 68

4. Driver Education 10 69

5. Health and Personal Development 10 71

6. Home Economics 73
   Clothing and Textiles 10 73
   Clothing and Textiles 20 73
   Clothing and Textiles 30 74
   Food Science 10 75

Food Science 20 76
Food Science 30 77
Modern Living 10 78
Modern Living 20 79
Modern Living 30 81

7. Industrial Education Program 83
General Introduction 83
Industrial Education 10, 20, 30 Series 84
Electricity/Electronics 86
Materials 89
Power Technology 92
Visual Communications 95
General Modules 97
Other Industrial Education Courses 98
Industrial Arts 12, 22, 32 Series (Career Development) 99
Visual Communications 99
Drafting 99
Graphic Arts 102
Commercial Art 106
Mechanics 108
Related Mechanics 108
Automotives 111
Auto Body 113
Aircraft Maintenance 116
Construction and Fabrication 118
Building Construction 119
Machine Shop 122
Welding 125
Sheet Metal 127
Piping 129
Electricity/Electronics 131
Electricity 132
Electronics 134
Personal Services 136
Food Preparation 137
Beauty Culture 139
Fashion and Furnishings 141
Health Services 143
Performing Arts/Television Crafts 144
Performing Arts 144
Television Crafts 145

8. Language Arts 147
The Philosophy of the Language Arts Program 147
Goals of Language Arts 149
General Language Arts Objectives 149
Statement of Content, English 13-23-33 and 10-20-30 151
Electives 152(xv)
Reading 10 152(xv)
Communications 21A and 21B 152(xv)
Literature 21A and 21B 153

9. French as a Second Language 154
Three, Six and Nine Year Programs 154
The 1974 Program 163
Ukrainian as a Second Language 164(ii)

German as a Second Language 164(ix)
Latin as a Second Language 164(xi)

). Mathematics 165
Mathematics 10, 13 165
Mathematics 20, 23 170(i)
Mathematics 15, 25 170(vii)
Mathematics 30, 33 171(xii)
Mathematics 31 172

. Music 173

2. Occupations 10 177

3. Physical Education 179
Physical Education 10 180
Physical Education 20 187
Physical Education 30 188

4. Production Science 30 189

5. Science 191
Objectives 192
Biology 10 192
Biology 20 194
Biology 30 195
Chemistry 10 197
Chemistry 20 200
Chemistry 30 202
Physics 10 206
Physics 20 208
Physics 30 210
Science 11 212
Physics 22 213
Physics 32 214

6. Social Sciences Options 215
Anthropology 215
Economics 216
Geography 218
History 220
Philosophy 222
Political Science 224
Psychology 226
Religious Studies 229
Sociology 230

7. Social Studies 232
Social Studies Defined 232
Objectives of the 1981 Alberta Social Studies Curriculum 232
Minimum Expectations 236
Learning Resources 237
What is Prescribed in Alberta Social Studies 237

DEVELOPING DESIRABLE PERSONAL CHARACTERISTICS

Children inhabit schools for a significant portion of their lives. Each day, in their relationships with fellow students, teachers and other adults who are in the school, children are exposed to a complex combination of influences, some deliberate and others incidental. In Canada, the common pattern of attitudes derives from many cultural sources, religious, ethnic and legal. Public schools exist within this culture and it is from this culture that the schools' dominant values emerge.

The school, as the site of a child's formal education, is not the sole or even dominant determiner of student attitudes. Other important sources of influence include the home, the church, the media, and the community. Educators alone cannot, and must not, assume the responsibility for the moral, ethical and spiritual development of their students. They do, however, play a significant role in support of other institutions. The actions of teachers and the activities which take place in schools contribute in a major way to the formation of attitudes.

Parents and other groups in society clearly expect teachers to encourage the growth of certain positive attitudes in students. These attitudes are thought of as being the prerequisites to the development of essential personal characteristics. For the guidance of all, the following list has been prepared. The list is not a definitive one, nor are the items ranked, but rather the list is a compilation of the more important attributes which schools ought to foster.

The Alberta community lives with a conviction that man is unique and is uniquely related to his world. Generally, but not universally, this expresses itself spiritually, through the belief in a Supreme Being (e.g., God). Moral/ethical characteristics, intellectual characteristics, and social/personal characteristics must be treated in a way that recognizes this reality and respects the positive contribution of this belief to our community.

1. Ethical/Moral Characteristics

Respectful	— has respect for the opinions and rights of others, and for property.
Responsible	— accepts responsibility for own actions. Discharges duties in a satisfactory manner.
Fair/just	— behaves in an open, consistent and equitable manner.
Tolerant	— is sensitive to other points of view, but able to reject extreme or unethical positions, free from undue bias and prejudice.
Honest	— is truthful, sincere, possessing integrity, free from fraud or deception.
Kind	— is generous, compassionate, understanding, considerate .
Forgiving	— is conciliatory, excusing; ceases to feel resentment toward someone.
Committed to democratic ideals	— displays behavior consistent with the principles inherent in the social, legal and political institutions of this country.
Loyal	— is dependable, faithful, devoted to one's friends, family and country.

2. Intellectual Characteristics

Open-minded	— delays judgments until evidence is considered and listens to other points of view.
Thinks critically	— analyzes the pros and cons; explores for and considers alternatives before reaching a decision.

Intellectually curious	— is inquisitive, inventive, self-initiated, searches for knowledge.
Creative	— expresses self in an original but constructive manner; seeks new solutions to problems and issues.
Pursues excellence	— has internalized the need for doing his/her best in every field of endeavour.
Appreciative	— recognizes aesthetic values. Appreciates intellectual accomplishments and the power of human strivings.

3. **Social/Personal Characteristics**

Cooperative	— works with others to achieve common aims.
Accepting	— is willing to accept others as equals.
Conserving	— behaves responsibly toward the environment and the resources therein.
Industrious	— applies himself diligently, without supervision.
Possesses a strong sense of self worth	— is confident and self-reliant, believes in own ability and worth.
Persevering	— pursues goals in spite of obstacles.
Prompt	— is punctual; completes assigned tasks on time.
Neat	— organizes work in an orderly manner, pays attention to personal appearance.
Attentive	— is alert and observant; listens carefully.
Unselfish	— is charitable, dedicated to humanitarian principles.
Mentally and physically fit	— possesses a healthy, sound attitude toward life; seeks and maintains an optimum level of bodily health.

RELIGIOUS INSTRUCTION

There are two sections in THE SCHOOL ACT which have to do with religious instruction. They are reproduced here for the information of teachers and administrators.

SECTION 160. board may

(a) prescribe religious exercises for pupils in its schools, and

(b) permit religious instruction for pupils in a school.

(R.S.A. 1970, c. 329, s. 160)

SECTION 163. (1) Upon receipt by a teacher of a written statement signed by a parent requesting that a pupil be excluded from religious or patriotic exercises or instruction, or both, the pupil shall be permitted to leave the classroom or may be permitted to remain without taking part.

(2) No teacher, trustee, inspector or superintendent, shall attempt in any way to deprive a pupil who attends a school in which religious instruction is given and who does not take part in that instruction, of any advantage that he might derive from the ordinary education given in the school.

(3) Any attempt under subsection (2) on the part of a teacher, trustee, inspector or superintendent, shall be held to be a disqualification for and voidance of the position or office held by him.

(R.S.A. 1970, c. 329, s. 163)

Through talk the students learn to organize their environment, interpret their experiences and communicate with others. As they mature they continue to use talk for these purposes as well as to check their understandings against those of others and to build up an objective view of reality.

- At all levels of schooling classes should be organized so that there are opportunities for teachers and students to interact through the medium of talk.
- The recognition of talk as a significant vehicle for learning must consider the processes involved in understanding meaning conveyed by others as well as the student's own expression of meaning.
- Experiences are enriched when they are shared through conversation and discussion.

Through writing the student can learn to clarify thought, emotion and experience, and to share ideas, emotions and experiences with others.

- Writing affords an opportunity for careful organization of one's picture of reality.
- Through writing students can be encouraged to develop the precision, clarity and imagination demanded for effective communication.
- Through writing students can become sensitive to different purposes and audiences in communication.

Various mass media have their own characteristic ways of presenting ideas.

- To discern the nature and value of ideas presented through mass media requires a knowledge of the language proper to a particular medium.
- The school must help students develop a mass media literacy through an intelligent exploration of how ideas are conveyed and through discriminative reaction and personal use of media.

Literature is an integral part of language learning.

- Students should have many opportunities to experience and respond to literature at all stages of their development.
- Access to a wide variety of literary material is essential to a balanced comprehensive literature program.

GOALS OF LANGUAGE ARTS FOR GRADES 1-12

Language is a social behaviour. Therefore, the language arts program should provide opportunities for students to experience language in functional, artistic and pleasureful situations with the aim:

- to develop awareness of and interest in how language works;
- to develop an understanding and appreciation of a wide range of language use;
- to develop flexibility in using language for a variety of purposes.

GENERAL LANGUAGE ARTS OBJECTIVES FOR GRADES 1-12

The program objectives of the language arts for grades 1-12 arise out of the GOALS FOR BASIC EDUCATION and the goals for the language arts program for grades 1-12. Although the objectives are applicable at all levels, the emphases may vary from level to level or from grade to grade. Through developing skills in listening, speaking, reading, writing, viewing and other related language

abilities the program should assist students to grow in their knowledge of language, to appreciate its value in their lives and to use it well. Accordingly, the program should provide opportunities for students to develop their understanding and apply their knowledge in the following dimensions of language:

- Production and reception of sounds and printed words

  This objective refers to the ability of students to hear and produce the sounds in words and to recognize and write words. It represents the phonics component of the objectives. Together with the next objective, it suggests that relationships between sounds and printed sentences are made in the context of the full meaning of individual sentences and larger pieces of writing. These two objectives underscore the need for developing in students a "sense" or a "feeling" for what sentences and stories are.

- Relationships between the flow of words in speech and the arrangement of words on the printed page

  This objective deals with the development by students of an ability to recognize that lines of print are given meaning by the reader or the listener, as well as that pitch, pause and juncture in speech are related to the ways words are arranged and punctuated in print. In addition, there is an important implication here that writing and reading are skills to be dealt with together — to be integrated.

- Use of language to talk about language

  This objective is concerned with the introduction and extension of a useful vocabulary that will enable students to discuss their own writing and the writing of others. In elementary grades, for example, words like "sentence", "period", and "capital letter" are useful. In secondary grades, terms such as "subject", "agreement", "image", "symbol" and "metaphor" are appropriate. The emphasis here is on the immediate and continuing usefulness of such terms in classroom discussions of language.

- Order and form of words as signals to meaning

  This objective refers to the study of syntax and emphasizes the importance of the English language cueing system in learning to write and read. It points out that the positions of words in sentences signal meaning. For example, the word "the" is always followed by a noun. Our usual sentence arrangement is "subject — verb — object." Word endings such as "-ly", "-ing", or "-ed" are, in the context of sentences, cues to meaning.

- Relationship between diversity and subtlety of word meanings and the total meaning of a communication

  This objective deals with semantics, the relationship between meaning and word choice. Activities that promote vocabulary development are appropriate. Word banks, displays of words about the classroom, the development of individual dictionaries, and the use of dictionaries and thesauri are important.

- Relationships between the manner in which ideas are organized and presented and the total meaning of a communication

  This objective refers to style, whether in speech or in written prose and poetry. Literary presentations suit some kinds of ideas; exposition or narration suit others. Some ideas are presented through a combination of these forms. Thus, the objective is concerned with the full, interrelated meaning of the information carried and the feeling expressed in a communication. Meaning and feeling are affected by the style and the organization of the presentation.

- Extension and enrichment of meaning through nonverbal communication

  This objective is concerned with nonverbal communication as it contributes to the meaning of English language utterances. Hence, it includes facial and body movements that accompany speech, as well as pictures, music or other sounds that accompany and extend the meaning of both spoken and written expression.

- Language variation according to audience, purpose, situation, culture and society

  This objective refers to the ways in which communication acts relate to the circumstances in which they are used. It implies that writers, readers, listeners and speakers generate and interpret communication acts on the basis of their own experiences. It suggests also that writers and speakers need audiences, purposes and situations that are clearly defined when, in classroom exercises, they are asked to speak or to write. Objectives 6, 7 and 8 emphasize the crucial importance of knowing how and when to use language appropriately (rather than "correctly"), and suggest that severe social penalties may result from being unable to do so.

- Immediate language variation in sensitive response to audience reaction

  This objective builds on the previous four objectives and underscores the importance of the ability to adjust communication acts in accordance with the reactions of audiences. Thus, students should develop the ability to change the form or tone of a message they are attempting to communicate if audience reaction signals that it is beneficial to their purpose to do so.

- Language is a dynamic system which records, reflects and affects cultures

  This objective emphasizes a number of linguistic factors, among which are these: (1) sensitivity to language change; (2) acknowledgement of the importance of literature to a culture; (3) sensitivity to the ways in which various cultures affect change in the English language; and (4) acknowledgement that the English language and its structures strongly affect and maintain our culture.

- Use of language to explore the environment and ideas of others, to develop new concepts to evaluate what is discovered

  This objective refers to the use of language to find out about the world and those who live in it. As in the other objectives, discussion, reading, writing, viewing and listening are all involved in language as it operates as our basic vehicle for thought. This has relevance to the concept of thought levels and argues that attention be paid to inferential, appreciative and applicational levels of thought and comprehension.

- Role of language in increasing understanding of self and others

  This objective emphasizes the roles of literature, writing and discussion as ways for understanding others and ourselves. It is particularly important to the fulfillment of this objective that writing and discussion be looked upon as ways of organizing and explaining our own thoughts and feelings to ourselves. This objective suggests that various grouping procedures be used to facilitate discussion.

- Use of language to stir imagination, deepen understanding, arouse emotion and give pleasure

- Relationship of language to other forms of artistic expression

These objectives emphasize the appreciation of artistic, carefully presented written and spoken communication and suggest the study of figurative language and the use of multisensory approaches. These objectives recognize the importance of relating form and feeling in all artistic expression. These two objectives stress, as well, the ways in which various artistic forms of expression seek to deal with feelings and values and, in general, with what it is to be a human being.

STATEMENT OF CONTENT: ENGLISH 13-23-33

WRITING

CONCEPTS	SKILLS 13	SKILLS 23	SKILLS 33
	THE STUDENT SHOULD BE ABLE TO:	THE STUDENT SHOULD BE ABLE TO:	THE STUDENT SHOULD BE ABLE TO:
1. Appropriate prewriting strategies can assist a writer in discovering and expressing meaning.	— use brainstorming, group or class discussion, exploratory writing, personal experience and incidental reading to generate ideas for writing;		
	— identify his purpose and audience and direct his writing to that audience;		
	— identify a topic with some assistance from teacher suggestion and select appropriate supporting material from ideas generated through pre-writing activities;	— establish an appropriately limited subject for writing and identify suitable material from that which has been generated in pre-writing activities;	— limit his subject quite independently and provide sufficient materials for his purpose;
	— recognize the value of using his personal experience for examples and illustrations in support of an idea;	— recognize situations where other sources of information are needed and find and incorporate this information into his composition;	— use the appropriate pre-writing activities in fulfilling his intention.
	— plan his compositions, and allow for discovery of meaning as he writes.		
2. Appropriate organization and development of meaning are essential qualities of written composition.	— write an introduction which leads directly to the topic;	— write an introduction which engages the interest and focuses the attention of the reader;	
	— develop his ideas by using methods appropriate to his topic (e.g., examples or reasons);	— use methods of development suitable for his particular purpose and audience;	— make use of a variety of methods of development;
	— demonstrate the ability to organize his thoughts coherently;		
	— compose a suitable ending.	— write a conclusion which follows the train of thought established.	— conclude without a mechanical repetition of ideas.
3. Effective revision involves careful evaluation of ideas and a further shaping of the composition.	— review assignments and compositions carefully to assure that all instructions have been followed;		
	— identify those ideas which have not been adequately developed and improve the expression of those thoughts;		
	— revise his word choice and sentence structure in terms of their appropriateness for his subject, purpose and audience;		
	— proofread his composition for errors in grammar, usage, punctuation and spelling;	— examine his composition for faulty mechanics, unity and coherence;	— examine his composition for faulty mechanics, unity, coherence, emphasis and proportion;
	— produce a revised version, carefully proofread, with a suitable title, footnotes and bibliography where appropriate.		
4. A writer's ideas and experiences can be presented through various modes of discourse.	— use personal or exploratory writing, such as journal writing or personal reactions, to express and clarify his thoughts and feelings and to develop ideas for other types of writing;		
	— share some of his thoughts or feelings with other people through shaped and polished writing;		
	— use clear, functional prose when his purpose is utilitarian, such as when conveying information or arguing a point of view.		

(Revised 1981)

ENGLISH 30

1. Gehle, Q.L. and D.J. Rollo, *The Writing Proeess*, Canadian Edition, Nelson, 1981.
2. Winkler, A.C. and J.R. McCuen, Dent, *Rhetoric Made Plain*, Canadian Edition, Academic, 1981.
3. Perrine, L., *Story and Structure*, Revised Edition, Academic, 1981.
4. New, W.H. and W.E. Messenger, *Active Stylist*, Prentice-Hall, 1981.
5. Miller, J.E., *The Lyric Potential*, Gage, 1981 (1974).
6. Hogins, J.B., *Literature: Poetry*, Science Research Associates, 1981 (1974).
7. Gillanders, C. *Theme and Image II*, Copp Clark Pitman, 1976.
8. Landry, A.S. *The Heath Introduetion to Literature*, D.C. Heath Canada Limited, 1981.

ENGLISH 13-23-33 HANDBOOK

Bell, J.B. and E.P.J. Corbett. *The Little English Handbook for Canadians*, John Wiley and Sons Canada Limited, 1977.

Communications Handbook, Nelson Canada Limited, 1981.

ENGLISH 10-20-30 HANDBOOKS

Messenger, W.E. and J. de Bruyn. *The Canadian Writer's Handbook*, Prentice-Hall Canada Inc., 1980.

Shaw, H. *Handbook of English*, Third Canadian Edition, McGraw-Hill Ryerson, 1979.

NOTE:

See Section F of the SECONDARY LANGUAGE ARTS HANDBOOK for recommended novels, full length non-fiction, modern plays, Shakespearean plays for English 13-23-33 and 10-20-30. These are currently under review. Revised lists will be available late in the 1982-83 school year.

ELECTIVES

READING 10

(See the Reading 10 Curriculum Guide.)

COMMUNICATIONS 21A and 21B

Introduction

Communications 21A and 21B are offered in module form for three credits each. A maximum of six credits is available to a student taking modules in the Communications Elective.

The Communications modules subscribe to the major objectives as stated in the *Secondary Language Arts Handbook*. All modules focus on the basic skills of writing, reading, viewing, listening, speaking and acting as well as providing for student involvement, excitement and enjoyment. In the Communication modules, emphasis has been placed on the improvement in writing skills as an ongoing process.

Course Content

Choice can be made from fifteen modules. Credit value is shown after each module:

Business Communications (3 or 6 — Part A prerequisite to Part B)
Community Relations Network (3 or 6)
English As A Second Language (6)
Film (3 or 6 — Part A prerequisite to Part B)
How, What and Why of Writing (3 or 6 — Part A *not* prerequisite to Part B)
Journalism (3 or 6 — Part A prerequisite to Part B)
Language As A Manipulative Device (3 or 6 — Part A prerequisite to Part B)
Language Growth (3 or 6)
Plain Speaking (3)
Purposeful Speaking (3)
Radio (3)
Speeded Comprehension (3)
Television (3 or 6 — Part A prerequisite to Part B)
Thinking — The Core of Communication (3 or 6 — Part A prerequisite to Part B)
Writer's Workshop (3 or 6 — Part A *not* prerequisite to Part B)

Recommended Material

A number of references are suggested for each module, but no textbooks are prescribed. Refer to the *Secondary Language Arts Handbook* for a list of these materials.

2. THE CONTENT SPECIFIED IN THE CATEGORIES OF LANGUAGE USE
3. THE SKILLS AND CONCEPTS IDENTIFIED IN THE PERFORMANCE STATEMENTS
4. THE MAJOR CULTURAL THEMES.

The elective components consist of:

1. THE SUGGESTED VOCABULARY
2. THE SUGGESTED TOPICS FOR EACH MAJOR CULTURAL THEME.

These elective components are found in the appropriate curriculum guide.

I. PRESCRIBED RESOURCES

1. Three-Year Program

1. Valette, R.M. and Valette, J.P. *French for Mastery*. Toronto: D.C. Heath and Company, 1975. Books 1 and 2.
2. Valdman, Albert, et al. *Son et Sens/Scènes et Séjours*. 2d. ed. Glenview, Ill.: Scott, Foresman and Company, 1977.
3. *Nos Amis/Le Monde des Jeunes*. French 1 and 2. New York: Harcourt Brace Jovanovich, 1980.

2. Six-Year Program (Senior High)

1. Calvé, R. et al. *Le Français International* 2d. ed. Montréal: Centre Educatif et Culturel Inc., 1974-1975. Books 3 to 5.

3. Nine-Year Program (Senior High)

1. Kenny, M. et al. *Passeport Français*. Toronto: D.C. Heath Canada Limited, 1973. Levels 5 to 8.

II. THE 1974 PROGRAM

A. SUGGESTED EXPECTATIONS FOR FRENCH AT THE END OF LEVEL ONE

The curriculum outline included on Pages 8-27 of the curriculum guide* identifies the language content to which students will be exposed during LEVEL ONE, and it suggests the linguistic and attitudinal behaviours expected of students at the end of this level of language learning.

LEVEL ONE is considered to be an **initial** experience in learning the French language, and it may occur at any grade(s) of the student's career in the

* *French as a Second Language*, Tentative Curriculum Guide, Levels 1, 2 and 3 (Secondary), 1974.

secondary school. The attainment of LEVEL ONE proficiency may occur in a variety of ways, such as the successful completion of:

a) a three-year program in the junior high school;

b) a two-year program in the junior high school, equivalent in time exposure to three years of study;

c) a one-year program in the senior high school, during which students learn the concepts and develop the skills and attitudes suggested for LEVEL ONE.

The successful completion of LEVEL ONE by a student should result in his subsequent placement in a LEVEL TWO program, i.e. French 20. **In schools where the students have been exposed to more than the core content required of LEVEL ONE, it is suggested that students register in French 11 when it is offered.**

B. SUGGESTED EXPECTATIONS FOR FRENCH AT THE END OF LEVEL TWO

The curricular outline included on Pages 29-38 of the curriculum guide* identifies the language content to which students will be exposed during the intermediate level of language learning and suggests the linguistic and attitudinal behaviours expected of these students at the end of that level.

This intermediate level is considered to be LEVEL TWO. The completion of LEVEL TWO should be equated with successful achievement in French 20 and French 30. **In schools where French 11 and 21 are offered, LEVEL TWO is considered to be equivalent to the successful completion of these two courses.**

Note: At the end of LEVEL TWO, students are expected to have mastered the vocabulary of *Le Français Fondamental, Premier Degré,*** along with the language content suggested for LEVEL TWO in the curriculum guide.

C. SUGGESTED EXPECTATIONS FOR FRENCH AT THE END OF LEVEL THREE

The curricular outline included on Pages 40-43 of the curriculum guide* identifies the language content to which students will be exposed during the advanced level of language learning and suggests the linguistic and attitudinal behaviours expected of these students at the end of that level.

The advanced level is considered to be LEVEL THREE, and its implementation as a course should reflect an emphasis on cultural understanding and an appreciation of the way of life of French-speaking peoples, especially those living in Canada, rather than an exclusive focus on the continued development of linguistic skills. **French 31 is the course to be implemented at LEVEL THREE.** Either French 21 or French 30 is a prerequisite or corequisite for French 31.

French 31:

French 31 is intended to further the objectives suggested for the learning of a second language, namely cultural understanding and effective communication. French 30 is a prerequisite or a corequisite of French 31, although in schools where French 11 and French 21 are available, it will be offered to students who have successfully completed French 21.

**French as a Second Language.*
**Available from the School Book Branch.

8. Recognize similarities and differences in these expressions of culture and his own;
9. Identify some of the values, attitudes and ideas of the target culture.
10. Identify some of the contributions made by Ukrainians to Canadian society.

D. OBJECTIVES AND CONTENT

Specific skills, objectives and content of each grade level are outlined in the Three-year and Six-year Ukrainian Program Curriculum Guides, Alberta Education, 1981.

The objectives and content are selected on the basis of categories of language use. Examples are:

1. Social Conventions
2. Identification of Persons and Things
3. Expressing Actions
4. Expressing Location
5. Destination
6. Describing People and Things
7. Expressing Permission and Desire
8. Expressing Quantity
9. Expressing Time
10. Expressing Possession
11. Expressing Cause and Effect
12. Specification of Persons and Objects
13. Indirect Speech
14. Identification of Person's Nationality

These language functions are considered to be main categories of verbal communication. In the classroom, each of the above categories may be realized separately or in various combinations. In this program, expected verbal performances and linguistic content are specified for each category.

E. PERFORMANCE STATEMENTS

The performance statements indicate the minimum that students are expected to **do** in verbal communication in the second language.

F. LINGUISTIC CONTENT

The linguistic content identifies the minimum language structures, sentence patterns, changes in word forms and vocabulary that students are expected to acquire in order to engage in verbal communication.

The categories of language use, the performance statements and linguistic content for each grade level are not arranged in a sequential order, although it is recommended that the specified objectives and content be covered by the end of each grade. It is expected that the content specified in the categories of language use and the skills described in the performance statements and minimum expectations be mastered by the end of Grade 12.

G. MAJOR CULTURAL THEMES

The following cultural themes are to be developed as part of core content in Grades 10, 11 and 12. (Specific topics within each theme are elective.)

1. CONVENTIONS
2. ROLE OF THE FAMILY AND COMMUNITY
3. ROLE OF EDUCATION IN SOCIETY
4. ROLE OF GOVERNMENT IN SOCIETY
5. INFLUENCE OF GEOGRAPHY, CLIMATE AND NATURAL RESOURCES ON THE ECONOMIC AND CULTURAL DEVELOPMENT OF THE UKRAINIAN PEOPLE LIVING IN DIFFERENT COUNTRIES OF THE WORLD
6. ROLE OF THE ARTS AND SCIENCES AND THEIR IMPACT ON WORLD CULTURES.

In summary, the core components consist of:

1. THE MINIMUM EXPECTATIONS FOR SKILL DEVELOPMENT AND CULTURAL UNDERSTANDING
2. THE CONTENT SPECIFIED IN THE CATEGORIES OF LANGUAGE USE
3. THE SKILLS AND CONCEPTS IDENTIFIED IN THE PERFORMANCE STATEMENTS
4. THE MAJOR CULTURAL THEMES
5. THE STUDY OF CULTURES OF UKRAINIAN-SPEAKING PEOPLE IN THE WORLD.

The elective components consist of:

1. THE SUGGESTED VOCABULARY
2. THE TOPICS SPECIFIED FOR EACH MAJOR CULTURAL THEME.

These elective components are found in the appropriate curriculum guide.

H. LEARNING RESOURCES

1. Three-Year Program

Recommended

1.1 **Grade 10:**

Duravetz, G. *Ukrainian Conversational and Grammatical,* Level I. Toronto: Ukrainian Teachers' Committee, Ontario Modern Language Teacher's Association, 1977.

1.2 **Grades 11 and 12:**

Duravetz, G. *Ukrainian Conversational and Grammatical,* Level II. Rev. ed. Toronto: Ukrainian Teachers' Committee, Ontario Modern Language Teacher's Association, 1976.

2. Six-Year Program

Prescribed

2.1 **Grade 10 and 11:**

Duravetz, G. *Ukrainian Conversational and Grammatical,* Level II. Rev. ed. Toronto: Ukrainian Teachers' Committee, Ontario Modern Language Teacher's Association, 1977.

Recommended

2.2 **Grade 12:**

Stechishin, J.W. *Ukrainian Grammar.* Winnipeg: Trident Press Limited, 1977.

GERMAN AS A SECOND LANGUAGE

A. SUGGESTED EXPECTATIONS FOR GERMAN AT THE END OF LEVEL ONE

The curricular outline included on Pages 7-16 of the curriculum guide* identifies the language content to which students will be exposed during LEVEL ONE, and it suggests the linguistic and attitudinal behaviours expected of students at the end of this level of language learning.

LEVEL ONE is considered to be an **initial** experience in learning the German language, and it may occur at any grade(s) of the student's career in the secondary school. The attainment of Level One proficiency may occur in a variety of ways, such as the successful completion of:

a) a three-year program in the junior high school;

b) a two-year program in the junior high school equivalent in time exposure to three years of study;

c) a one-year program in the senior high school, during which students learn the concepts and develop the skills and attitudes suggested for Level One.

The successful completion of LEVEL ONE by a student should result in his subsequent placement in a LEVEL TWO program, i.e. German 20.

B. SUGGESTED EXPECTATIONS FOR GERMAN AT THE END OF LEVEL TWO

The curricular outline included on Pages 17-23 of the curriculum guide* identifies the language content to which students will be exposed during the intermediate level of language learning and suggests the linguistic and attitudinal behaviours expected of these students at the end of that level.

This intermediate level is considered to be LEVEL TWO. The completion of LEVEL TWO should be equated with successful achievement in German 20 and German 30.

C. SUGGESTED EXPECTATIONS FOR GERMAN AT THE END OF LEVEL THREE

The curricular outline included on Pages 24-27 of the curriculum guide* identifies the language content to which students will be exposed during the advanced level of language learning and suggests the linguistic and attitudinal behaviours expected of these students at the end of that level.

The advanced level is considered to be LEVEL THREE, and its implementation as a course should reflect a greater concern for cultural understanding and an appreciation of the German way of life rather than an exclusive focus on the continued development of linguistic skills. **German 31 is the course to be implemented at LEVEL THREE.** German 30 is a prerequisite or corequisite for German 31.

* *German as a Second Language,* Tentative Curriculum Guide, Levels 1, 2 and 3 (Secondary), 1974.

German 31:

German 31 is intended to further the objectives suggested for the learning of a second language, namely cultural understanding and effective communication. German 30 is a prerequisite or corequisite for German 31.

The language content and the linguistic and attitudinal behaviours outlined in Level Three of the curriculum guide contain the basic core suggested for the advanced program in German.

Principles, guidelines and suggested instructional materials for implementing German 31 are included in the document entitled, *German 31, Supplement to German as a Second Language,* Tentative Curriculum Guide, Levels 1, 2 and 3 (Secondary), 1974.

D. RECOMMENDED INSTRUCTIONAL MATERIALS*

The outline of language content and linguistic and attitudinal behaviours for LEVELS ONE and TWO in the curriculum guide for German contains the basic core suggested for an initial and intermediate program in this language. Teachers are advised to examine the instructional materials and select structures, concepts and expressions that correspond to the Program of Studies and curriculum guide. As lessons vary in substance, it is important to avoid a materials-centred, page-by-page, lesson-by-lesson coverage.

German 10:

A-LM. Level 1. 2nd ed. New York: Harcourt Brace Jovanovich, Inc., 1974.

or

Rehder et al. *Deutsch: Verstehen und Sprechen.* New York: Holt, Rinehart and Winston, 1962.

or

Rehder et al. *Deutsch: Verstehen und Sprechen.* Rev. ed. New York: Holt, Rinehart and Winston, 1970.

German 20:

A-LM. Level 1 and 2. New York: Harcourt Brace Jovanovich, Inc., 1970.

or

Rehder et al. *Deutsch: Verstehen und Sprechen.* New York: Holt, Rinehart and Winston, 1962.

or

Rehder et al. *Deutsch: Verstehen und Sprechen.* Rev. ed. New York: Holt, Rinehart and Winston, 1970.

Rehder et al. *Sprechen und Lesen.* New York: Holt, Rinehart and Winston, 1963.

or

Homberger, Conrad and Ebelke, John. *Foundation Course in German.* Rev. ed. Lexington, Mass.: D.C. Heath, 1964.

German 30:

A-LM. Level 2. 2nd ed. New York: Harcourt Brace Jovanovich, Inc., 1974.

or

Homberger, Conrad and Ebelke, John. *Foundation Course in German.* Rev. ed. Lexington, Mass.: D.C. Heath, 1964.

* *German as a Second Language*, Tentative Curriculum Guide, Levels 1, 2 and 3 (Secondary), 1974.

* In schools employing more than one instructional series in a sequential second language program, it is recommended that a curriculum plan be prepared to include objectives, content areas and evaluation procedures for each course. This would help to avoid duplication of content and would ensure continuity in a sequential program.

LATIN AS A SECOND LANGUAGE

A. OBJECTIVES

The specific objective of a program in any second language is to enable the learner to acquire a proficiency in a language other than his own tongue. For the study of Latin, this takes the form of gaining proficiency in:

a) reading and understanding Latin;

b) learning more about his own language;

c) learning about the ancient world and its values;

d) comparing and contrasting his own values with those of the ancient world;

e) appreciating the immense contribution of Latin to the English vocabulary.

B. RECOMMENDED LEARNING RESOURCES

Cobban, J.M. and Colebourne, R. *Civis Romanus.* 14th ed. London: Methuen, 1974.

Collins Latin Gem Dictionary. London: William Collins Sons & Co., 1980.

Jenny, C. *First Year Latin.* Toronto: Allyn & Bacon, 1979.

Taylor, B.C. and Prentice, K.E. *Selected Latin Readings.* Toronto: Dent, 1980.

NOTE: 1. Teachers are encouraged to utilize a large number of resource materials which emphasize the development of reading comprehension. The materials listed above are recommended for this purpose. Of those, only *Selective Latin Readings* by Taylor and Prentice can be obtained through the School Book Branch. The others are available through the publisher.

2. Students who have successfully completed the minimum content suggested for the Junior High School Latin program should register in Latin 20.

   Teachers who are recommending students for Latin 20 should ensure that the suggested course content for Latin 10 as outlined in the Program of Studies has been completed.

Math 13	Math 10	Common Core	
			14. State, prove and apply these basic theorems of geometry: (a) vertically opposite angle theorem (b) congruence of triangles using SAS, ASA, SSS (c) isosceles triangle theorem (d) parallel line theorems (e) the sum of the measures of the interior angles is 180°
			15. Apply the basic theorems to solve problems involving numerical applications.
			16. Solve problems related to vertically opposite angles.
			17. State and apply conditions for congruence of triangles — SAS, SSS, ASA
			18. State conditions for similarity and solve related problems.
			19. State the conditions for parallelism and apply to related problems.
			20. State and apply area formulas for triangles, rectangles, squares, parallelograms, trapezoids.
			21. Solve problems involving numerical applications of the relationships and conditions described in objectives 16 to 20.

MATHEMATICS 20, 23

New course objectives for Math 20, 23 have been approved for use on a mandatory basis in Alberta schools commencing August 25, 1982.

COURSE OBJECTIVES FOR MATHEMATICS 20 AND MATHEMATICS 23

A. RADICALS

MATH 20	MATH 23	COMMON CORE	
			1. Review the basic laws of exponents.
			2. Identify each part of a radical expression.
			3. Maintain previous skills.
			4. Simplify radical expressions.
			5. Perform the four basic operations on radicals of the form $\sqrt[b]{x}$, b = 2, 3.
			6. Rationalize radical denominators that are monomials and binomials.
			7. Solve radical equations containing one radical in one variable
			8. Solve radical equations containing two radicals in one variable.

B. POLYNOMIALS

			1. Maintain previous skills in algebraic operations.
			2. Maintain previous skills of factoring.
			3. Maintain previous skills of solving linear equations with one unknown.
			4. Factor polynomials of the form $p^3 \pm q^3$
			5. Factor polynomials which are incomplete squares.
			6. Factor polynomials by the grouping method.

C. COORDINATE GEOMETRY

			1. Maintain previous skills related to the following: quadrants, axis, origin and ordered pairs.
			2. Determine the distance between two points.
			3. Determine the coordinates of the midpoint of a line segment.
			4. Determine the slope of a line passing through two given points.

MATH 20	MATH 23	COMMON CORE	
			5. State the relationship between slopes of: a. parallel lines b. perpendicular lines
			6. Graph lines whose equations are in the form $Ax + By + C = 0$ or $y = mx + b$ by: a. using ordered pairs b. using the intercepts c. using the slope and y-intercept
			7. Interpret graphs of straight lines.
			8. Use the slope test to determine whether three points are collinear.
			9. State the intercepts of a line by examining the graph.
			10. Determine the intercepts of a line from its equation.
			11. Write an equation and draw the graph of: a. a vertical line b. a horizontal line
			12. Write an equation of a line and draw its graph given the slope and a point on the line.
			13. Write the equation of a line passing through a given point and a. parallel to a given line b. perpendicular to a given line
			14. Given two points: a. draw the graph of the line passing through them b. write the equation of the line passing through them

D. PRESENTATION OF DATA AND DESCRIPTIVE STATISTICS

			1. Maintain previous skills.
			2. Draw histograms and cumulative frequency histograms (ogives).
			3. Demonstrate how to obtain medians, quartiles and percentiles (graphically and from grouped data).
			4. Determine the dispersion of a variable by: a. using percentiles b. calculating the standard deviation

E. RELATIONS AND FUNCTIONS

			1. Define a relation.
			2. Define the domain and range of a relation and its inverse.

MATH 20	MATH 23	COMMON CORE	
			3. Determine the inverse of a relation.
			4. State the relationship between the domain and range of a relation and the domain and range of its inverse.
			5. State the relationship between the graph of a relation and the graph of its inverse.
			6. Define a function.
			7. Use the functional notation f(x) in defining a function.
			8. For particular values of x, find f(x).
			9. Define and graph a linear function.

F. QUADRATIC FUNCTIONS, EQUATIONS & APPLICATIONS

			1. Identify and express quadratic functions in the form $y = ax^2 + bx + c$ where a, b, cϵR, $a \neq 0$.
			2. Identify and express quadratic equations in the form $ax^2 + bx + c = 0$ where a, b, cϵR, $a \neq 0$.
			3. Graph a quadratic function using a table of values.
			4. Find the vertex, axis of symmetry, domain, range and maximum or minimum value of a quadratic function from its graph.
			5. Use the formula for vertex and axis of symmetry if the quadratic function is given in the form $y = ax^2 + bx + c$.
			6. State the relationship between the graph of a quadratic function and the roots of the corresponding equation.
			7. Write quadratic equations in the form $ax^2 + bx + c = 0$ and specify the value of a, b, c.
			8. Use the method of completing the square of a quadratic function to find the vertex, axis of symmetry, range and maximum or minimum value. Draw the graph using this information.
			9. Solve problems involving the maximum or minimum value of a quadratic function.
			10. Compute the real roots of a quadratic equation by: a. factoring b. using the quadratic formula c. completing the square
			11. Define and evaluate the discriminant of a quadratic equation.
			12. State the nature of the roots by examining the discriminant.

MATH 20	MATH 23	COMMON CORE	
			13. Solve problems whose solutions are based on quadratic equations.

G. SYSTEMS OF EQUATIONS

			1. Solve linear systems of equations both algebraically and graphically.
			2. Identify systems as having many solutions, one solution or no solution.
			3. Solve problems based on the solution of systems of equations.
			4. Solve linear-quadratic and two-quadratic systems.

H. GEOMETRY

			1. Define and illustrate the following terms related to the circle: radius, chord, interior, exterior, arc, semi-circle, segment, sector, central angle, inscribed angle, secant line and tangent line.
			2. Discover by experimentation the following circle relationships: a. A line through the centre of a circle and the midpoint of a chord is perpendicular to the chord. (Converses should also be considered). b. The measure of an inscribed angle is half the measure of the central angle subtended by the same arc (or congruent arcs). c. Inscribed angles subtended by the same arc (or congruent arcs) are congruent. d. An angle inscribed in a semi-circle is a right angle. e. A tangent line is perpendicular to the radius drawn to the point of contact. f. Tangent segments drawn to a circle from the same exterior point are congruent.
			3. Solve problems involving numerical applications of the relationships in objective 2.
			4. Apply the following basic theorems: a. A line containing the centre of a circle that bisects a chord, which is not a diameter, is perpendicular to that chord. (Include corollaries) b. A tangent line is perpendicular to the radius drawn to the point of contact. c. The measure of an inscribed angle is half the measure of the central angle subtended by the same arc (or congruent arcs).
			5. Construct a tangent to a circle from a given point.
			6. Find the length of an arc given the measures of the central angle and the radius.

			7. Find the area of a sector given the measures of the central angle and the radius.
			8. Solve problems involving numerical applications of the above theorems.

I. TRIGONOMETRY

			1. Maintain previously developed skills in solving right triangles.
			2. Define secant, cosecant and cotangent ratios.
			3. Determine the secant, cosecant and cotangent values of acute angles.
			4. Determine the measure of any acute angle given the secant, cosecant and cotangent ratio.
			5. Solve right triangles using trigonometric ratios.
			6. Solve problems involving right triangles including angles of elevation and depression.
			7. Determine the relative measures of the sides of: a. a 30 - 60 - 90 triangle b. a 45 - 45 - 90 triangle

J. VARIATION

			1. Maintain previous skills of direct, inverse and partial variation.
			2. Identify joint variation.
			3. Solve problems related to joint variation.

Elective Component

Teachers are advised to consult the 1981 interim curriculum guide for Mathematics 20, 23 for a listing of suggested elective topics and learning resources.

REFERENCES — MATHEMATICS 20, 23

Mathematics 20

Prescribed References:

Math Is 5, Ebos, F., Tuck, B., Nelson Canada.

Holt Mathematics 5, Fryer, K. D., Dunkley, R. G., Elliott, H. A. Hill, N. J., Mackay, R. J. Holt, Rinehart & Winston Publishing, 1980.

Recommended Reference:

Foundations of Mathematics for Tomorrow: Intermediate, Dottori, D., Knill, G., Stewart, J. McGraw-Hill Ryerson Ltd., S. I. Metric Edition, 1978.

Mathematics 23

Prescribed Reference:

Applied Mathematics for Today: Intermediate, Dottori, D., Knill, G., Seymour, J. McGraw-Hill Ryerson Ltd., S.I. Metric Edition, 1976.

Recommended Reference:

Mathematics for a Modern World, Book 3, Second Edition. Burns, A. G., Pinkney, R. G. Gage Publishing, 1976.

MATHEMATICS 15 — 25

A new course outline for Mathematics 15 has been approved for use on a mandatory basis in Alberta schools, commencing August 25, 1982. Mathematics 25 is scheduled for optional use effective August 25, 1982; mandatory implementation to take place commencing August 25, 1983.

Schools not wishing to implement the 1982 course outline for Mathematics 25 may continue to follow the 1975 outline for Mathematics 25.

rescribed References (Mathematics 15)

Mathematics in Life, Bolster, L. C.; Woodburn, H. D.; Gage Publishing, Metric Edition, 1978.

Mathematics Plus, Shaw, B. R.; Denholm R. A.; Shelton, G. H.; Houghton Mifflin Canada, 1980.

Mathematics for Daily Use, Hayden, M. P., et al, Doubleday, 1980.

ATHEMATICS 15 — 25 GOALS

To develop in students a background in basic mathematics required in daily life situations.

To assist students in developing problem solving techniques which are applicable to a variety of life situations.

To revitalize the students' interest in mathematics through successful experiences at the students' level of understanding.

To develop in students a knowledge of the development of mathematics, its application in our world both past and present and toward the future.

OURSE OUTLINE FOR MATHEMATICS 15 — CORE

. NUMBER SYSTEM

Section A should be considered as a review for most students. Consideration should be given to the use of calculators in the development of concepts and skills.

PREVIOUS NUMBER SKILLS

TOPICS	APPLICATIONS
Estimation and reasonableness of answers: • In computation as well as problem solving	1. Use of calculators 2. Vacation costs, living costs, education costs and benefits, building costs, repair costs. 3. Problem solving skills 4. Games
Place value: • Multiplication and division • Powers of 10	1. Relation to metric system 2. Money notation 3. Writing cheques
Basic operations: • Whole numbers • Decimals • Positive and negative numbers • Single fractions	1. Living expense — food bills, rent, car payments, etc. 2. Banking services — deposit slips, cheques and balances 3. Insurance policies — homeowner, car, life 4. Income tax, monthly statements

(Revised 1982)

4. Order of operations: • Four basic operations • Use of parentheses • Application of the cummutative, associative and distributive properties • Use of zero and one (concentrate on whole numbers for instructional purposes)	1. Shortcuts in calculations 2. Math skill testing questions on cereal boxes, etc.

B. MEASUREMENT

TOPICS	APPLICATIONS
1. Metric measure: • Selection of appropriate units	1. Identify suitable units to measure real objects — carpet size, purchase of produce and other goods, medicine, shoe laces, etc.
2. Length: • mm, cm, m, km • Selection of appropriate units • Estimation • Measurement • Concept of and formulas for perimeter • Measuring instruments — ruler, trundle wheel, clippers, micrometer, odometer • Conversion — equivalent units within the SI system • Application to real world	1. Estimate and measure length of familiar objects and distance between objects
3. Area: • mm^2, cm^2, m^2, km^2, hectare • Selection of appropriate units • Estimation • Measurements — using a grid, calculation, formula • Conversion — equivalent units within the SI system • Application to real world	1. Estimate and measure area of familiar objects (books, desk, room) 2. Estimate area covered by finger, hand, shoe
4. Volume: • mm^3, cm^3, m^3 • Selection of appropriate units • Estimation • Measurement — using centimetre cubes, calculation, formula • Application to regular solids • Conversion-equivalent units within SI system • Applications to real world	1. Measure small familiar objects 2. Estimate and calculate volume of large objects

5. Capacity: • ML, L • Estimation • Measurement — standard and irregular containers • Conversion — equivalent units within SI system • Application to real world	1. Build a cubic decimetre 2. Estimate and measure volume. Relate to capacity
6. Mass: • mg, g, kg, t • Selection of appropriate units • Estimation • Conversion — equivalent units within SI system • Application within real world • Development of relationship between mass, capacity and volume units	1. Measuring — use of balances, scales
7. Pressure: • Kpa (brief introduction only)	1. Barometric readings 2. Tire and oil pressure
8. Temperature: • Celsius — C° • Identification of referent temperatures	1. 30°C hot summer day 150°C oven temperature

It is suggested that the History of Measurement Elective be incorporated into the Measurement Strand (as an introduction).

C. RATIO AND RATE

TOPIC	APPLICATIONS
1. Concept of ratio: • As a fraction form for comparison: $\frac{\text{Circumference}}{\text{radius}}$ • Notation: $\frac{C}{r}$ or C:r • Development of equivalent ratios — from the concept of equivalent fractions — from similar triangles	1. Mixture problems 2. Probability — odds 3. Energy consumption 4. Scale drawings 5. Shopping 6. Salaries 7. Sales costs
2. Concept of rate: • Per unit form e.g. litres per 100 kilometres, distance per hour	

3. Percent: a) Concept of percent: • Fraction form — denominator 100 • Other equivalent fraction forms • Discounts b) • Percents to decimals • Decimals to percents • Percents to fractions to percents	1. Circle graphs 2. Scale diagrams 3. Formulae 4. Grading 5. Taxation 6. Other business and commerce examples 7. Media material (newspaper, ads, flyer) 8. Population trends 9. Other real-world forms 10. Forecasting 11. Other subject areas

D. DATA PRESENTATION

TOPICS	APPLICATIONS
1. Interpretation and application of data from charts and graphs: • Include pictograph, circle graph, bar graph	1. Newspapers, other media 2. Sports and other subject areas 3. Weather forecasts
2. Collection and tabulation of data from environmental situations: • From experiments • From industrial examples	1. School activities 2. Population trends 3. Ethnic groups 4. Others
3. Construction of pictographs, bar graphs, circle graphs, line graphs from data collected	1. Data on school activities 2. Data on social affairs 3. Data on car sales 4. Data on use of drugs, alcohol, etc. 5. Others

E. ALGEBRA

TOPICS	APPLICATIONS
1. Concept of an expression: • Identify specific algebraic terminology: constants, variables, terms and factors	
2. Evaluating expressions: • Substitution into simple expressions and formulas	1. Science formulas: e.g. $d = rt$, $E = I \times R$ Business formulas: e.g. $i = prt$ Geometry formulas: e.g. — area — perimeter — volume

3. Words and algebraic expressions:
   - Translate English expressions into algebraic expressions
   - Translate algebraic expressions into English expressions

4. Solution of simple equations in one variable:
   $a + x = b$
   $ax = b$
   $ax + b = c$
   $\frac{x}{a} = \frac{b}{c}$
   $ax + bx = c$

5. Simple word problems

1. Practical problems in the fields of science, business and technology

MATHEMATICS 15 — ELECTIVES

A. BANKING SERVICES

TOPICS	SUBTOPICS (areas of application)
1. Bank Accounts	• Savings • Chequing • Personal chequing • Chequing — savings • Service charges • Deposits — cheques • Bank statements • Interest — simple and compound
2. Loans	• Single payment • Discount • Installment • Credit card • Debt consolidation • Education loans • Interest — simple and compound • Bankruptcy
3. Other Services	• Safety deposit box • Travellers' cheques • Government bonds • Short term certificates and deposits • Senior citizen services
4. Banks	• Bank of Canada — role • Chartered banks — role, service • Provincial type banks • Credit Unions

B. PERSONAL SALARIES AND OPERATING COSTS

TOPICS	SUBTOPICS (areas of application)
1. Personal income (wage earner or self-employed)	• Hourly wages • Salary — annual or monthly income • Commissions
Deductions	• Income tax (a major unit within Math 25) • Pension premiums • Medical insurance • Unemployment insurance • Others
2. Home ownership costs (house, apartment, condominium)	• Mortgage payments • Utility costs — heat, power, water, telephone, television, etc. • Improvement costs • Insurance • Furnishings
3. Rental (home or apartment)	• Comparative costs • Size, location, lease contracts • Comparison to ownership • Furnishings • Insurances • Utility costs • Others

C. THE AUTOMOBILE

TOPICS	SUBTOPICS (areas of application)
1. Operating an automobile	• New or used — initial cost • Loan plans • Insurance • Maintenance costs — operating expenses • Depreciation • Licence • Leasing • Fuel consumption versus speed
2. Other items	• Appreciation of cars (antique) • Leasing versus owning • Public transit versus driving • Fines and other costs involved in driving offences • Pollution • Brakes — types of effectiveness • Tires — cost and effectiveness

D. BUDGETING

TOPICS	SUBTOPICS (areas of application)
1. Pricing goods	• Comparison shopping, Canadian versus foreign items • Using the newspaper • Timing of sales • Seasonal buying • Bulk buying
2. Consumer tips — laws for consumers	• See Consumer Affairs
3. Market surveys	• Radio reports • T.V. programs • Government reports
4. Installment purchases	• i.e. automobile,, furniture and appliances • Finance charges (simple interest rates) • Monthly payments
5. Charge accounts	• Types — credit cards and accounts • Credit limits • Minimum payment • Statements • Finance charges (cost or credits)
6. Discounts	• Cash • Trade • Chain
7. Sales tax	• Provincial responsibility and purpose
8. Flexible budgeting	• Fixed expenses, flexible expenses • Savings
9. Holidays	• See Travel and Recreation

E. TRAVEL AND RECREATION

TOPIC	SUBTOPICS (areas of application)
1. Travel bureaus	• Functions • Travel packages • Seasonal differences • Budget plans
2. Travel costs	• Car, bus, air • Special, seasonal rates • Eurarail

3. Living expenses	• Meals • Recreation costs, i.e., Disney World • Purchases • Tips • Gifts • Medical insurance
4. Money exchange and modes of money use	• Travellers' cheques • Use of credit cards • Custom regulations
5. Map reading	• City maps • Provincial and State routes • Brochures re: Travel — Tourists' offices

F. CALCULATOR LITERACY (Mathematics 15 - 25)

TOPICS	SUBTOPICS (areas of application)
1. Mechanical aspects of various calculators	• Differences in power supply, automatic shut off • Differences in on/off switch location • Differences in keyboard layout • Durability of construction and proper care of the instrument
2. Capabilities	• Basic operations ($+ - \times \div$) • Basic operations with decimal numbers • Constant and memory features • Special function keys $\%$, x^2, y^n $\sqrt{\ }$ • Discuss other special function keys often available to science and commerce in special calculators
3. Limitations	• Recognize: digit capacity, overflow, "error", correction • Type of functions: scientific, commerce • Arithmetic limits: e.g. $1 \div 3 \times 3$ $(1/3 \times 3)$ is not 1 using a calculator • Limits of simple calculators in handling masses of data • Complex computations, large number of repetitions.
4. Calculator errors	• Errors in reading and keying in data and operations • Errors in reading output and display

5. When to use	• Experience a broad range of use in a variety of computational and problem solving situations • Use calculators in appropriate situations. Recognize and classify computational situations: e.g. (a) memorized number fact, (b) mental arithmetic, (c) pencil and paper arithmetic, (d) simple four-fraction calculator, (e) multi-function or programmable calculator, (f) computer

G. HISTORY OF MEASUREMENT

TOPICS	SUBTOPICS (areas of application)
1. The need for measurement	• Primitive man (Choosing club of sufficient size and weight, selecting an animal hide of adequate size, etc.) • Organized societies — trade and commerce • Standardized units
2. Ancient systems of measurement	• Egyptian measure • Greek measure • Roman measure
3. History of the English system	• Influence of the Greeks, Romans and Scandinavians • Imperial measure • American measure
4. History of the metric system	• Mathematical and scientific development (18th Century French Scientists)
5. Le Systeme Internalinal d'Unites	• Refinement and extension of the metric system • Increasing world use of SI

H. COMPUTER LITERACY

TOPICS	SUBTOPICS (areas of application)
1. History of computing	
2. How computers work	• Structure of computer systems • Functions of five major parts
3. Control of computers	• Communication with computers • How to instruct computers

4. What computers can and cannot do	• Capabilities and limitations • Misconceptions of computers
5. Characteristics of computers	• Speed, accuracy, tirelessness and the need to be programmed
6. Effect of computers on society	• Impact on individual groups: the economy, education, jobs, crime, etc. • Benefits and dangers of computerization
7. Application of computers	• Uses in business, government, science, education, etc. • Computer careers
8. Computers and the future	
9. Microcomputer operation (for those schools with machines available)	• Canned games and simulation programs • Familiarization with the communication process
10. Introductory programming ideas from Monitor, November, 1979	

Note: These topics for computer literacy are fairly comprehensive; any one or more of the topics may be chosen. It is not expected that the total literacy elective be attempted.

I. PYTHAGOREAN THEOREM AND SIMILAR TRIANGLES

TOPICS	SUBTOPICS (areas of application)
1. Pythagorean theorem	• Right triangle • Reading tables (square and square root)
2. Similar triangles	• Finding missing sides • Practical problems (finding heights, distances etc.)

J. GRAPHING ON A COORDINATE GRID

TOPICS	SUBTOPICS (areas of application)
1. Locating points of a grid	• City maps • Battleship
2. Co-ordinates as ordered pairs	
3. Cariesian co-ordinate plane	• x-axis, y-axis origin • Locating points on the plane • Reading co-ordinates from the plane

MATHEMATICS 25 (1975)

Recommended Text

Saake, T. F. & B. Conchie. *Business and Consumer Mathematics.* Addison-Wesley, Don Mills, 1975.

Course Outline

The following topics comprise the course outline for the 1975 Mathematics 25 course and should be considered as a suggested outline only. Teachers should feel free to modify the program to suit the needs and interests of their students. Such modification may include the deletion and/or addition of some topics. Not all topics listed are treated in the recommended text.

A. Management of Personal Property

1. Consumer Credit
2. Payroll and Commissions
3. Taxation
4. Automobile
5. Insurance
6. Budgeting
7. Stocks, Bonds and Investments
8. Real Estate

B. Application of Mathematics Principles* to

1. Construction
2. Sheet Metal
3. Electricity
4. Food Preparation
5. Machine Shop
6. Agriculture

*Teachers should use their discretion in utilizing basic concepts of algebra, geometry, and trigonometry in presenting this unit.

MATHEMATICS 25 — Core (1982)

A. NUMBER SYSTEM REVIEW

TOPICS	APPLICATIONS
1. Whole Numbers	
(a) Operations	1. Living Expenses
(b) Properties	2. Sales
	3. Games
	4. Problem Solving Skills
2. Integers	
(a) Concept of integers	1. Relate to the real world
	2. Temperature
	3. Sports
	4. Elevation
	5. Credit Accounts
	6. Deposits and withdrawals
(b) Order of integers — Location on a number line	1. Interpretation in real world, i.e., travel, profit and loss
(c) Operations — Four basic operations	1. GNP, living costs, deficit financing, credit accounts, bank deposits and withdrawals balance of trade
	2. Temperature changes
	3. Reading elevation differences, temperature differences, etc., from maps

3. Rational Numbers (a) Concept of rational numbers (b) Operations (c) Convert positive or negative rationals in the form of $\frac{a}{b}$ to decimals and vice versa	1. Sales — 1/3 off, etc. 2. Recipes 3. Stockmarket 4. Time
4. Percent (a) Concept of percent — Fraction form — denominator 100 — Other equivalent fraction forms — Discounts (b) Conversion — Percents to Decimals — Decimals to Percents — Percents to fractions to percents	1. Circle graphs 2. Scale diagrams 3. Formulas 4. Grading 5. Taxation 6. Other business and commerce examples 7. Media material 8. Population 9. Other real world forms 10. Forecasting 11. Other subject areas

B. ALGEBRA

TOPICS	APPLICATIONS
1. Equations (a) Definition of an equation (b) Rules of equations (c) Transposing terms (d) Combining like terms (e) Equations containing fractions and decimals	1. Examine practical problems in the fields of science, business and technology using algebraic and graphical solutions. 2. Science formulas — temperature, distance rate — parachutist's fall Geometry formulas — area, perimeter 3. Grid plans for cities and new townsites Telephone rates are based on a rate system

C. DATA PRESENTATION

TOPICS	APPLICATIONS
1. Organization of data — Tables — Graphs	1. Relate to charts, graphs and tables in magazines, newspapers, books, kilometre distance charts on maps, etc.
2. Use of frequency tables and diagrams — Population — Classes — Intervals	2. Inaccurate and biased tables 1. Student grades 2. Height and weight 3. Birth rates 4. Salaries

3. Representation and study of data in graphical form
   — Pictographs
   — Circle graphs
   — Bar graphs
   — Line graphs
   — Misleading graphs
   — Scatter diagrams
   — Predictions
4. Finding mean, median, and mode — interpretation and use

1. **Business and Commerce** — GNP, budgets, employment figures, imports and exports, insurance rates and mortality tables, salaries
2. **Environment** — pesticides, traffic, pollution fuel efficiency, population makeup, temperatures, energy supplies.
3. **Health and Medicine** — growth rates, calories, hazards of smoking, muscle fatigue, pulse rate, blood types
4. **People and Culture** — census figures, population sizes and trends, voice ranges, instruments
5. **Recreation** — sports (batting averages, etc.) gambling, types of T.V. programs

D. LIFE SKILLS

TOPICS	APPLICATIONS
1. The World of Work — Methods of payment — Gross Pay — Take Home Pay	— Salaries, commissions, piecework, overtime — Deductions (U.I., C.P.P., Union Dues, Income Tax, others)
2. Income Tax (Note: suggested that teachers use the TAX BOOK for the current year. This is available from Revenue CANADA TAXATION.)	— History of Canadian Income Tax — Filing of a simple Income Tax return (i.e., student part time job) — Filing more complicated income tax returns (i.e., married with dependents, 2 jobs, U.I.)
3. Money Management — Gross Income — Total Expenditures (rent, food, clothing, transportation, recreation) — Net Income and savings — Filing Income Tax Return based on above	— Budgeting for yourself while living with your parents — Budgeting for yourself while supporting yourself — Budgeting for yourself and your imaginary family after you have "graduated" from your chosen career and are employed full-time

MATHEMATICS 25 — ELECTIVES (1982)

A. CONSUMER TOPICS

INSURANCE (Mathematics 25)

TOPICS	SUBTOPICS (areas of application)
1. Life	— Straight life, endownment, term — Group life — Disability forms — Special features — premiums, double indemnity, insured policies, cash value, borrowing clauses, mortality tables, etc.

2. Health	— Alberta Health Plan — Blue Cross — Dental Plans — Travel Insurance — life and health
3. Home Owners	— Home, other units — fire, theft, water, storms, etc. — Contents — furniture, other contents — Special possessions — Premiums, liability, etc. — Understanding blueprints
4. Auto	— Types — liability, collision, comprehensive, medical — Rate factors — vehicle type, living location, personal aspects of insured — No fault insurance — Provincial insurance plans — Others — boats, snowmobiles, etc.

NOTE: Teachers are advised to consult the Mathematics 15-25 Curriculum Guide for listings of suggested learning resources for the elective component.

TAXATION (Mathematics 25)

TOPICS	SUBTOPICS (areas of application)
1. Federal Taxes	— Income — Capital Gains — Sales — Excise, customs and duties
2. Provincial Taxes	— Income — Special forms — license, car, fishing — road tax — death tax
3. Municipal Taxes	— Home and property — Recreational property — Terms — assessment, mill rate, etc.
4. Sales Taxes	— Provincial forms — Taxable and non-taxable items

LOANS AND FINANCING (Mathematics 25)

TOPICS	SUBTOPICS (areas of application)
1. Bank Loans	— Types of loans — Interest charges — Mortgages — Other services — Educational

2. Credit Card	— General credit cards — bank association — Store or company cards — Annual and monthly rates — Advantages and disadvantages — Revolving charge accounts — Special credit card loans
3. Installment Buying	— Types — Percentage rates — interest rates — Monthly payments
4. Finance Companies	— Loan types — Interest charges — Methods of payment

INVESTMENTS (Mathematics 25)

TOPICS	SUBTOPICS (areas of application)
1. Commodities	— Gold — Silver — Other Metals — Grain — Livestock — Jewellery — Stamps — Antiques
2. Stocks and Bonds	— Stocks — Mutuals — Saving Bonds
3. Real Estate	— Land — Buildings — Mortgage investment companies
4. Cash Deposits	— Savings account (a) Banks (b) Trust companies — Pensions — RRSP — RHOSP

TRAVEL AND RECREATION (Mathematics 15 — 25)

TOPICS	SUBTOPICS (areas of application)
1. Travel Bureaus	— Functions — Travel packages — Seasonal differences — Budget plans
2. Compare Travel Costs	— Car, bus, air — Special seasonal rates — Eurail
3. Living Expenses	— Meals — Recreation costs, i.e., Disney World — Purchases — Tips — Gifts — Medical insurance

4. Money Exchange and Modes of Money Use
   - — Traveller's cheques
   - — Use of credit cards
   - — Custom regulations

5. Map Reading
   - — City Maps
   - — Provincial and State routes Brochures, re: travel-tourists offices

B. GEOMETRY (Mathematics 25)

OBJECTIVES	APPLICATIONS
1. Concepts and Terminology	1. Paper folding 2. Geoboard 3. Advertising in newspaper, etc. 4. In nature 5. Filing papers — environment, arts, wallpaper, clothing 6. Surface areas in classroom, home, shop and home economics. 7. Advertising 8. Sports 9. Traffic signs 10. Construction industry 11. Jewellery design
(a) Angles — related terms and concepts Vertex, side (ray), degree straight angle, right angle, acute, obtuse, reflex, adjacent, complementary, supplementary, vertically opposite	
(b) Triangles — related terms and concepts Equilateral, equiangular, isosceles, scalene, obtuse, right, hypotenuse, Phythagorean Theorem, conditions for similarity, congruence, trigonometry	
(c) Polygons — related terms Quadrilateral, trapezoid, parallelogram, rectangle, rhombus, square, regular, diagonal	
(d) Parallel lines — related terms and concepts Transversal, corresponding angles, alternate angles, interior angles, conditions for parallelism when a transversal intersects two lines	
(e) circle Centre, radius, diameter, sector, segment, chords, etc.	

2. Measure an angle with a protractor	1. Make a protractor
3. Construct	
(a) An angle congruent to a given angle	1. Use slides, turns, reflections 2. Using compass, straight edge and Mira
(b) The bisector of a given angle	
(c) A perpendicular to a given segment	
At a given point on a segment	
Through a point not on the same segment	
(d) Right bisector of a line segment	
(e) A line parallel to a given line	
(f) Construct angles 30°, 45°, 60°, 90°	
(g) Construct geometric figures	
Square, rectangle, parallelogram, triangle	
4. Prisms and Pyramids	
(a) Prisms	1. Curve stitching 2. Points, lines, planes in classrooms, shops, school, home 3. Three-dimensional modes 4. Three-dimensional objects in classroom, school, shops, homes 5. Supermarket 6. Architecture, buildings 7. Nets of 3-D objects 8. Nature
Identified by the base; vertex edge, face; description of prisms in the real world	
(b) Pyramids	
Identified by the base; vertex, edge, face, description of pyramids in the real world	
5. Trigonometry	
(a) Find unknown sides in similar triangles	1. Measuring distances to man-made satellites and the moon 2. Measuring by triangulation — use of a range finder 3. Measure circumference of the earth using Eratosthene's method 4. Finding distances and heights of mountains, trees, rivers, buildings — slope 5. Surveying and scaling 6. Navigation problems by air and water 7. Photography — enlargements and reductions 8. Architectual designs 9. Orienteering 10. Use of apparatus — clinometer, theodolite, transit 11. Apply to radar
(b) Apply similar triangles to practical problems, e.g., height of a building, distance across a river, etc.	
(c) Define sine, cosine and tangent functions for right angle triangles	
(d) Find the ratios of two acute angles in a right triangle when the sides are given	
(e) Use tables to find trig ratios for a given angle	
(f) Use tables to find an angle when one of the ratios is given	
(g) Solve problems based on right triangles using trigonometric ratios	

6. Pythagorean Theorem	Using the Pythagorean Theorem to calculate indirect measures Verify measures gained in trigonometric calculations Calculate heights of cones In addition to squares on the sides of a right triangle to prove Pythagoras, use equilateral triangles, semi-circles, regular pentagons, etc. Make a Pythagorean spiral

C. POWERS AND ROOTS (Mathematics 25)

OBJECTIVES	APPLICATIONS
1. Laws of indices — understanding and estimation of powers and roots	
2. Calculations involving powers	
(a) Multiplication	
(b) Division	
3. Calculation of square roots	
(a) Using tables	
(b) Using calculators	
4. Scientific notation	Naming distances within the universe
(a) Changing conventional numbers into scientific notation form	Rewriting answers to products and quotients that are very large or very small
(b) Converting scientific notation into conventional form	Relating scientific notation to pictographs
(c) Multiplication	
(d) Division	

D. PROBABILITY (Mathematics 25)

OBJECTIVES	APPLICATIONS
1. Notion of probability and chance	1. Dice, playing cards, spinners
2. Finding probabilities and predicting outcomes	2. Sports 3. Codes 4. Bingo 5. Licence plates 6. Telephone numbers 7. Weather 8. Coin combinations 9. Insurance 10. Seating arrangements 11. Genetics
3. Finding probabilities using a tree diagram	
4. Rule for simple probability	
5. Odds	
6. Dependent and independent events	

2. Measure an angle with a protractor	1. Make a protractor
3. Construct (a) An angle congruent to a given angle (b) The bisector of a given angle (c) A perpendicular to a given segment At a given point on a segment Through a point not on the same segment (d) Right bisector of a line segment (e) A line parallel to a given line (f) Construct angles 30°, 45°, 60°, 90° (g) Construct geometric figures Square, rectangle, parallelogram, triangle	1. Use slides, turns, reflections 2. Using compass, straight edge and Mira
4. Prisms and Pyramids (a) Prisms Identified by the base; vertex edge, face; description of prisms in the real world (b) Pyramids Identified by the base; vertex, edge, face, description of pyramids in the real world	1. Curve stitching 2. Points, lines, planes in classrooms, shops, school, home 3. Three-dimensional modes 4. Three-dimensional objects in classroom, school, shops, homes 5. Supermarket 6. Architecture, buildings 7. Nets of 3-D objects 8. Nature
5. Trigonometry (a) Find unknown sides in similar triangles (b) Apply similar triangles to practical problems, e.g., height of a building, distance across a river, etc. (c) Define sine, cosine and tangent functions for right angle triangles (d) Find the ratios of two acute angles in a right triangle when the sides are given (e) Use tables to find trig ratios for a given angle (f) Use tables to find an angle when one of the ratios is given (g) Solve problems based on right triangles using trigonometric ratios	1. Measuring distances to man-made satellites and the moon 2. Measuring by triangulation — use of a range finder 3. Measure circumference of the earth using Eratosthene's method 4. Finding distances and heights of mountains, trees, rivers, buildings — slope 5. Surveying and scaling 6. Navigation problems by air and water 7. Photography — enlargements and reductions 8. Architectual designs 9. Orienteering 10. Use of apparatus — clinometer, theodolite, transit 11. Apply to radar

(Revised 1982)

6. Pythagorean Theorem	Using the Pythagorean Theorem to calculate indirect measures Verify measures gained in trigonometric calculations Calculate heights of cones In addition to squares on the sides of a right triangle to prove Pythagoras, use equilateral triangles, semi-circles, regular pentagons, etc. Make a Pythagorean spiral

C. POWERS AND ROOTS (Mathematics 25)

OBJECTIVES	APPLICATIONS
1. Laws of indices — understanding and estimation of powers and roots	
2. Calculations involving powers	
(a) Multiplication	
(b) Division	
3. Calculation of square roots	
(a) Using tables	
(b) Using calculators	
4. Scientific notation	Naming distances within the universe
(a) Changing conventional numbers into scientific notation form	Rewriting answers to products and quotients that are very large or very small
(b) Converting scientific notation into conventional form	Relating scientific notation to pictographs
(c) Multiplication	
(d) Division	

D. PROBABILITY (Mathematics 25)

OBJECTIVES	APPLICATIONS
1. Notion of probability and chance	1. Dice, playing cards, spinners
2. Finding probabilities and predicting outcomes	2. Sports
3. Finding probabilities using a tree diagram	3. Codes
4. Rule for simple probability	4. Bingo
5. Odds	5. Licence plates
6. Dependent and independent events	6. Telephone numbers
	7. Weather
	8. Coin combinations
	9. Insurance
	10. Seating arrangements
	11. Genetics

E. MOTION GEOMETRY (Mathematics 25)

A Study of Transformations

OBJECTIVES	APPLICATIONS
1. Overview of Transformations	
Mapping, distance preserving, isometry, congruence	
Study of motions in geometry	
Models — mirrors, mira, paper folding, tracing paper	
2. Basic Terminology	
Translations (slides) Reflections (flips) Rotations (turns) Dilations (enlargements and reductions) Distortions Line Symmetry Rotational symmetry	
3. Translations (slides)	Tracing on grid systems
Illustrate slides — object, image, slide, arrow, etc.	Skids, ski-lifts
	Art work — tessalations, wallpaper, lettering, signs
Identify relation to congruency	
Relation to vectors	Machinery — pulleys, planes, etc.
Illustrations in real world	Movie machines, film frames
Properties	Logos
Application in real world	Games — pool television
4. Reflections (flips)	Tracing on grid systems
Illustrate flips through activities — object, image, reflection line, symmetry	Mirror images — science concepts
	Letter through mira
Relation to congruency through parallel lines	Art work
Illustrations — art and nature, etc.	Illustrations in nature
Properties	
Composition of motion	
Applications in real world	
5. Rotations (turns)	Trace on grid system
Illustrate turn images — centre of rotation, angle of rotation, etc.	Turns in real world — transportation careers, driving, etc.
Relation to reflection and congruency through intersecting lines	Industry — machinery, lathes, car repair, etc.
	Use in art world — geometric
Illustrations	
Properties	
Applications in real world	

(Revised 1982)

6. Dilations (size transformation)	Mapping
Develop enlarged and reduced images	Scale drawing
Scale drawings	Photography
Applications in real world	Film Industry — projection microfiche
7. Distortions	Mirrors — circus
Draw images using a distorted grid	Art World
8. Basic Constructions	
Perpendicular and parallel lines	
Construct geometric figures — various polygons	
Bisections	
Corresponding segments	
Circle	
9. Symmetry and Congruency	
Both topics integrated within basic motion studies	
Line, plane and rotational symmetry	
Applications	
Properties	

ELECTIVES — OTHER

CALCULATOR LITERACY (Mathematics 15 — 25)

TOPICS	SUBTOPICS (areas of application)
1. Mechanical Aspects of Various Calculators	— Differences in power supply, automatic shut off — Differences in on/off switch location — Differences in keyboard layout — Durability of construction and proper care of the instrument
2. Capabilities	— Basic operation (+, -, x, ÷) — Basic operations with decimal numbers — Constant and memory features — Special function keys — Discuss other special function keys often available to science and commerce in special calculators
3. Limitations	— Recognize: digit capacity, overflow, "error", correction — Type of functions: scientific, commerce — Arithmetic limits; e.g. (1/3 x 3) is not 1 using a calculator — Limits of simple calculators in handling masses of data — Complex computations, large number of repetitions

4. Calculator Errors	— Errors in reading and keying in data and operations — Errors in reading output and display
5. When to Use	— Experience a board range of use in a variety of computational and problem solving situations — Use calculators in appropriate situations. Recognize and classify computational situations: e.g. (a) memorized number fact, (b) mental arithmetic, (c) pencil and paper arithmetic, (d) simple four-function calculator, (e) multi-function or programmable calculator (f) computer

COMPUTER LITERACY (Mathematics 15 — 25)

TOPICS	SUBTOPICS (areas of application)
1. History of Computing	
2. How Computers Work	— Structure of computer systems — Functions of five major parts
3. Control of Computers	— Communication with computers — How to instruct computers
4. What Computers Can and Cannot Do	— Capabilities and limitations — Misconceptions about computers
5. Characteristics of Computers	— Speed, accuracy and need for appropriate commands
6. Effect of Computers on Society	— Impact on individual groups, the economy, education, jobs, crime, etc. — Benefits and dangers of computerization
7. Application of Computers	— Uses in business, government, science, education, etc., — Computer careers
8. Computers and the Future	
9. Microcomputer Operation (For those schools with machines available)	— Canned games and simulation programs — Familiarization with the communication process
10. Introductory Programming	

Note: These topics for computer literacy are fairly comprehensive; any one or more of the topics may be chosen. It is not expected that the total literacy elective be attempted.

If the "Computer Literacy" elective is used for both Mathematics 15 and Mathematics 25, topics should be dealt with in greater depth at the Mathematics 25 level, **or** different topics within the elective should be chosen for each course.

MATHEMATICS 30, 33

New course outlines for Mathematics 30 and 33 have been approved for use on an optional basis in Alberta schools, commencing August 23, 1982. The course outlines will become mandatory on August 23, 1983. Schools not wishing to implement the 1982 course outlines for Mathematics 30 and 33 may continue to follow the 1971 outlines for the 1982-83 school term.

MATHEMATICS 30 (1971)

Recommended Texts

Nichols, Eugene D., Ralph T. Heimer, and E. Henry Garland. *Modern Intermediate Algebra.* Revised Edition. Toronto: Holt, Rinehart and Winston of Canada Ltd., 1969.

Vance, Elbridge P., Booklet: *Mathematical Induction-Conic Sections.* Don Mills, Ontario, Addison-Wesley Publishing Company, 1971.

Teachers' References

1. Elliott, H. A., K. D. Fryer, J. C. Gardner, N. J. Hill. *Algebraic Structures and Probability.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1966.
2. Elliott, H. A., K. D. Fryer, J. C. Gardner, N. J. Hill. *Functions, Relations, and Transformations.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1966.
3. Vance, Elbridge, P., *An Introduction to Modern Mathematics,* Second Edition, Don Mills, Ontario: Addison-Wesley Publishing Co., 1968.

Course Outline*

The topics listed below comprise the basic outline for Mathematics 30. The teacher should feel free to use supplementary materials to aid in the teaching of these topics and should consult the curriculum guide for additional references.

1. Trigonometric Functions and Their Applications
2. Vectors
3. Sequences, Series and Limits
4. Binomial Theorem
5. Permutations and Combinations
6. Probability Functions
7. Polynominal Functions
8. Conic Sections
9. Mathematical Induction

* Teachers should use their discretion in utilizing basic concepts of algebra, geometry, and trigonometry in presenting this unit.

MATHEMATICS 33 (1971)

Text

Dean, J. E., C. F. Hutchinson, and G. E. Moore. *Principles of Mathematics,* Book III. Holt, Rinehart and Winston of Canada, Ltd., 1970.

Objectives

1. To assist the student in the learning process by developing mathematical concepts through an inductive approach.
2. To use applications from various areas such as mensuration, science and the real world, for the purpose of reinforcing concepts.
3. To develop powers of analyzing problems and presenting solutions in a clear manner.
4. To develop and maintain an understanding of the operations and concepts of mathematics by using an essential core supplemented by exploratory topics.
5. To develop and maintain skill in mathematical operations by these means.

Course Outline

A. Algebra

1. Relations and Functions
2. Quadratic Functions
3. Maximum and Minimum values of quadratic functions
4. Variation
5. Exponential and Logarithmic Functions
6. Inverse functions
7. Permutations and Combinations
8. Binomial Theorem

B. Trigonometry

1. Sine Law and Cosine Law
2. Pythagorean relations and trigonometric equations
3. Vectors
4. Using trigonometry to solve vector problems

C. Elementary Descriptive Statistics

1. Frequency distribution tables, frequency histograms, frequency polygons
2. Quartiles and percentiles
3. Measures of variability
4. Standard Measure
5. Binomial Distribution
6. Curve of normal distribution

A. RELATIONS AND FUNCTIONS

Math 30	Math 33	Common Core	
			1. Define a relation and its domain and range, utilizing graphs and algebraic statements.
			2. Define the term function.
			3. Use functional notation f(x) for particular values of x.
			4. Define and graph a linear function.
			5. Show the relationship between the graphs of linear and quadratic functions and the roots of the corresponding equations.

B. TRIGONOMETRY

			1. Maintain previously developed skills.
			2. Describe circular paths using the initial point and directed distance of the path.
			3. Define the unit circle $x^2 + y^2 = 1$.
			4. Determine coordinates of points on the unit circle.
			5. Define the trigonometric ratios in terms of coordinates of points on the unit circle.
			6. Find the domain and range of the six trigonometric functions.
			7. Solve simple trigonometric equations.
			8. Given the value of one of the trigonometric ratios, evaluate the other five trigonometric ratios.
			9. Derive and apply the following identities: a. Quotient relations: $\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\quad\quad$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$ b. Reciprocal Relations: $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$ $\cot\theta = \frac{1}{\tan\theta}$

Math 30	Math 33	Common Core	
			c. Pythagorean Relations: $\sin^2\theta + \cos^2\theta = 1$ $1 + \tan^2\theta = \sec^2\theta$ $1 + \cot^2\theta = \csc^2\theta$
			10. Derive and apply the following identities: a. Negative Arc Formulas: $\sin(-\theta) = -\sin\theta$ $\cos(-\theta) = \cos\theta$ $\tan(-\theta) = -\tan\theta$ b. Sum Formulas: $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$ $\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$ c. Complementary Arc Formulas: $\cos\left(\frac{\pi}{2} - \theta\right) = \sin\theta$ $\sin\left(\frac{\pi}{2} - \theta\right) = \cos\theta$
			11. Draw and identify the graphs of the sine, cosine and tangent functions.
			12. Define periodic function and state the periods of $\sin\theta$, $\cos\theta$, $\tan\theta$.
			13. Define radian measure.
			14. Convert degree measure to radian measure and vice versa.
			15. Determine exact values of trigonometric ratios of 0°, 30°, 45°, 60° and 90°.
			16. Determine the value of a trigonometric ratio of any angle.
			17. Solve oblique triangles by using the sine law and/or cosine law.
			18. Apply the sine law and cosine law to practical problems.
			19. Solve problems involving area of regular polygons.

C. QUADRATIC RELATIONS (CONIC SECTIONS)

Math 30	Math 33	Common Core	
			1. Maintain previous skills in analytic geometry: a. linear functions and slope b. distance and midpoint formula c. properties of tangents from Math 20 d. solution of systems of equations in two variables
			2. State the definition of the circle and derive the standard form.
			3. Convert the equation of a circle from standard to general form.
			4. Determine the equation of a circle and sketch the graph given these conditions: a. centre and radius b. centre and a point c. centre and equation of tangent line d. three points on a circle e. two points and equation of line containing the centre
			5. Define and identify a parabola and the terms: focus, vertex and axis.
			6. Derive the standard form of the equation of a parabola with a horizontal or vertical axis of symmetry.
			7. Find the focus and directrix from the equation of a parabola.
			8. Determine an equation and sketch the parabola given: a. focus and directrix b. vertex and directrix c. vertex and point on the parabola
			9. Solve applied problems related to the parabola.
			10. Define and identify an ellipse and the terms: foci, major axis, minor axis, vertices and focal radii.
			11. Derive the standard form of the equation of an ellipse with foci on the x-axis or y-axis.
			12. Given the equation of the ellipse, determine: foci, vertices, major axis and minor axis.
			13. Derive the relation between the parameters a, b and c for the ellipse. $(a^2 = b^2 + c^2)$
			14. Determine an equation and sketch the ellipse given: a. minor axis and distance between foci b. vertices and foci c. vertices and a point on ellipse

Math 30	Math 33	Common Core	
			15. Solve applied problems related to the ellipse.
			16. Define and identify a hyperbola and the terms: vertices, foci transverse axis, conjugate axis and asymptotes.
			17. Derive the standard form of the equation of a hyperbola with foci on the x-axis or the y-axis.
			18. From the equation of the hyperbola find the foci, vertices, transverse axis, conjugate axis and asymptotes.
			19. Derive the relation between the parameters a, b and c for the hyperbola. $(a^2 + b^2 = c^2)$
			20. Determine an equation and sketch the hyperbola given: a. transverse axis and conjugate axis b. foci and length of one axis c. equation of an asymptote and a point on the hyperbola
			21. Solve applied problems related to the hyperbola.

D. SEQUENCES, SERIES, LIMITS

			1. Recognize the difference between: a. a sequence and a series b. finite and infinite sequences
			2. a. Recognize and define arithmetic sequences and series and state the common difference (d) b. Derive and apply: i. the general term formula $a_n = a_1 + (n-1)d$ ii. the sum formula $s_n = \frac{n}{2}(a_1 + a_n)$ c. Apply formulas to problems involving arithmetic sequences and series.
			3. a. Recognize and define geometric sequences and series and state the common ratio (r) b. Derive and apply: i. the general term formula $a_n = a_1 r^{n-1}$ ii. the sum formulas $s_n = \frac{a_1(r^n-1)}{r-1}, r \neq 1$ $s_n = \frac{ra_n - a_1}{r-1}, r \neq 1$

(Revised 1982)

Math 30	Math 33	Common Core	
			c. Apply formulas to problems involving geometric sequences and series, with special emphasis being given to the mathematics of finance: i. Difference between and applications of simple and compound interest. ii. Use tables to determine accumulated and present value accounts involving compound interest over different time periods. iii. Illustrate the various annuities by using line diagrams. iv. Apply geometric series to both accumulated and present value annuities with both identical and differing interest and payment periods.
			4. Generate the terms of a series using sigma notation (Σ).
			5. Determine the limits of various functions.
			6. Recognize the differences between infinite convergent and divergent sequences.
			7. Find the limits of infinite convergent sequences.
			8. Find the sums of infinite convergent series.
			9. Solve problems involving infinite geometric series.

E. PRESENTATION OF DATA AND DESCRIPTIVE STATISTICS

			1. Maintain previous skills. a. frequency distribution b. measures of central tendency c. measures of dispersion
			2. Illustrate and develop the normal distribution.
			3. Develop and apply standard deviation.
			4. Introduce probability using an experimental approach.
			5. Apply probability to theoretical frequency distribution.

F. QUADRATIC FUNCTIONS, EQUATIONS AND APPLICATIONS

			1. Identify and express quadratic functions in the form $y = ax^2 + bx + c$ where $a, b, c \in R, a \neq 0$
			2. Identify and express quadratic equations in the form $ax^2 + bx + c = 0$ where $a, b, c \in R, a \neq 0$
			3. Graph a quadratic function using a table of values.

Math 30	Math 33	Common Core	
			4. Find the vertex, axis of symmetry, domain, range and maximum or minimum value of a quadratic function from its graph.
			5. Use the formula for vertex and axis of symmetry if the quadratic function is given in the form $y = ax^2 + bx + c$.
			6. State the relationship between the graph of a quadratic function and the roots of the corresponding equation.
			7. Write quadratic equations in the form $ax^2 + bx + c = 0$ and specify the value of a, b, c.
			8. Use the method of completing the square of a quadratic function to find the vertex, axis of symmetry, range and maximum or minimum value. Draw the graph using this information.
			9. Solve problems involving the maximum or minimum value of a quadratic function.
			10. Compute the real roots of a quadratic equation by: a. factoring b. using the quadratic formula or completing the square
			11. Define and evaluate the discriminant of a quadratic equation.
			12. State the nature of the roots by examining the discriminant.
			13. Solve problems whose solutions are based on quadratic equations.

G. LOGARITHMS

			1. Maintain previous skills on exponents.
			2. Identify and graph exponential functions.
			3. Convert equation from exponential form to logarithmic form and vice versa.
			4. Solve logarithmic equations by converting to exponential form.
			5. Define the inverse of an exponential function in logarithmic form.
			6. Evaluate expressions and solve equations involving logarithmic form and exponential form.
			7. State and use the basic laws or properties of logarithms, products, quotients, powers and roots.
			8. Use logarithms to solve practical problems.

Elective Component

Teachers are advised to consult the 1982 interim curriculum guide for Mathematics 30, 33 for a listing of suggested elective topics and learning resources.

TEXTS AND REFERENCES (1982)

MATHEMATICS 30:

Prescribed References:

Math Is/6
Frank Ebos, Bob Tuck
Nelson/Canada Ltd., 1982

Foundations of Mathematics for Tomorrow: Senior
Dino Dottori, George Knill, James Stewart
McGraw-Hill Ryerson Ltd., 1979

Recommended Reference:

Holt Mathematics 6
Kenneth D. Fryer, Ronald G. Dunkley, H. A. Elliott, Norman J. Hill, R. Jock MacKay
Holt, Rinehart and Winston of Canada Ltd., 1981

MATHEMATICS 33:

Prescribed Reference:

Applied Mathematics for Today: Senior
Book 1 Second Edition
Dino Dottori, George Knill, John Seymour
McGraw-Hill Ryerson Ltd., 1977

Recommended Reference:

Mathematics for a Modern World
Book 4
E. G. Carli, J. C. Egsgard, C. Psica, J. J. Del Grande
Gage Publishing Ltd., 1975

MATHEMATICS 31

NOTE 1: Mathematics 31 is under review. A questionnaire regarding possible revision of the course has been distributed to schools for input. A report of the findings and recommendations will be presented to the Curriculum Policies Committee in the fall of 1982.

NOTE 2: Mathematics 31 is made up of two parts — (1) Calculus AND (2) Vectors and Matrices.

CALCULUS

TEXTS

Either:

Elliott, H. A., D. Fryer, J. C. Gardner and N. J. Hill, *Calculus.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1966.

or

Elliott et al. *Calculus, Complex Numbers and Polar-Coordinates.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1974.

Teachers' References

Elliott et al. *Solutions for Calculus.*
Lang, S. *Calculus.* Addison-Wesley.

Course Content

1. Slopes and Tangents	(Chapter 1)
2. Distance, Velocity and Acceleration	(Chapter 2)
3. Maxima and Minima	(Chapter 3)
4. Sequences, Limits and Derivatives	(Chapter 4)
5. Derivatives of Functions	(Chapter 5)
6. Tangents, Derivatives and Graphs	(Chapter 6)
7. Further Applications of Derivatives	(Chapter 7)
8. Solutions of $Dxy = f(x)$	(Chapter 8)
9. Areas	(Chapter 9)

VECTORS AND MATRICES

TEXTS

Either

Elliott et al. *Vectors and Matrices.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1967.

or

Elliott et al. *Vectors, Matrices and Algebraic Structures.* Toronto: Holt, Rinehart and Winston of Canada Ltd., 1972 or 1974 editions.

Teachers' References

Elliott et al. *Solutions to Vectors and Matrices.*
Davies, Philip J. *The Mathematics of Matrices.* Blaisdell Publishing Company, 1965.

Course Content

1. Vectors	(Chapter 1)
2. Algebraic Vectors	(Chapter 2)
3. Length and Inner Product	(Chapter 3)
4. Systems of Linear Equations	(Chapter 6)
5. Matrices and Linear Transformations (optional)	(Chapter 7 of 1967 ed.)

SCIENCE

General Objectives of Science Education 1-12

1. To develop the ability to inquire and investigate through the use of science process skills.
2. To promote assimilation of scientific knowledge.
3. To develop attitudes, interests, values, appreciations and adjustments similar to those ideally exhibited by scientists at work.
4. To develop an awareness and understanding of the environment with positive attitudes and behaviours toward its use.
5. To develop a critical understanding of those current social problems which have a significant scientific component in terms of their cause and/or their solution.
6. To promote awareness of the humanistic implications of science.
7. To promote an understanding of the role that science has in the development of societies and the impact of society upon science.
8. To contribute to the development of vocational knowledge and skill.

OBJECTIVES OF HIGH SCHOOL BIOLOGY

Students should:

1. Develop an understanding of the interdependence of living things upon themselves and upon climatic and soil factors.

2. Examine the dependence of man on his natural environment, the ways by which man is creating problems by upsetting the balance of nature, and ways by which man can live in greater harmony with nature.

3. Investigate the major differences which exist between various life forms and apply these principles by learning to identify various biological groups and species.

4. Understand the processes by which plants and animals function.

5. Learn through project and laboratory experiences the ways by which biologists carry out field and laboratory research.

6. Develop proficiency in the use of laboratory instruments.

7. Develop an understanding of the need for using a critical, quantitative approach when looking at biological data, especially as life forms and organic material often react in ways that are less predictable than is the case with inorganic material.

BIOLOGY 10

(3 Credits)

Objectives of the Biology 10 Program

10.1 To promote understanding and development of research skills by carrying out a project.

10.2 To study the principles of cell biology.

10.3 To gain a better understanding of the principles of classification.

10.4 To learn reasons for and techniques of collecting and maintaining appropriate biological specimens and to develop an appreciation of the importance of these activities.

10.5 To study the development and relationship of form, function and role in nature of the groups of life forms by the comparative study of representatives of the biological kingdoms.

Prescribed References

Biological Sciences Curriculum Study, *Biological Science: An Ecological*

5. Cellular respiration
   a. Energy release
      i. aerobic respiration
      ii. anaerobic respiration
   b. Energy utilization
      i. muscular contraction
      ii. absorptive activity
      iii. electrochemical activity
      iv. various syntheses

6. Excretion
   a. Kidney function
   b. Body fluid balance

7. Metabolic Controls
   a. Genetic control of hormones and nervous responses
   b. Hormonal
      i. plants
      ii. animals
   c. Nervous
      i. receptors
      ii. conductors
      iii. effectors

8. Human Reproduction

Unit II — Current Biological Problems (About 25 hours)

The text by R. Wagner is recommended for this unit and should be used with discretion — see the curriculum guide for further guidance.

Unit III — Student Project (About 20 hours)

Each student is expected to engage in a project to complete this program as in Biology 10 and 20. The project may be in any area related to biology. Encouragement may be given to have students investigate current biological problems or other topics that may focus on scientific, sociological, economic or political factors.

CHEMISTRY 10

Objectives of the Chemistry 10 Program

After participating in the activities and completing the requirements of this course, the student should:

10.1 Know those concepts of chemistry as specified in the core outline.

10.2 Have competence in the language of chemistry, naming and writing the formulas and chemical equations.

10.3 Be skilled in techniques used by investigators in the field of chemistry.

10.4 Have a background knowledge related to the importance of chemicals and chemical processes in our economy.

10.5 Be aware of the possible harm to the environment which may arise from heavy metals.

10.6 Know the contributions made by various scientific investigators to the topics being studied.

10.7 Be aware of chemistry as a possible vocation and have an appreciation of its association with other sciences.

Organization of Program:

Approximately 40 hours of instructional time shall be devoted to the core topics and about 25 hours to elective topics. The content of the elective units is to relate to the core in one of three ways:

a. an extensive study of a core topic (breadth)
b. an in-depth, intensive study of a core topic, or
c. a practical application of a core topic

Prescribed Core References

Ledbetter, E. W. and J. A. Young, *Keys to Chemistry.* Don Mills: Addison-Wesley, 1977

Ledbetter, E. W. and J. A. Young, *Laboratory Keys to Chemistry.* Don Mills: Addison-Wesley, 1977

Jenkins, F. et al, *ALCHEM 10.* Edmonton: J. M. LeBel Enterprises, 1979.

Recommended Core References

Courneya, D. and H. McDonald, *The Nature of Matter.* Toronto: D. C. Heath and Company, 1976

Whitman, R. L. and E. E. Zinck, *Chemistry Today.* Scarborough: Prentice-Hall Canada, 1976

IAC Modules:
Atkinson, G. and H. Heikkinen, *Reactions and Reason.*
Huheey, J., *Diversity and Periodicity.*
Don Mills: Fitzhenry and Whiteside (Harper & Row), 1973

OUTLINE OF CHEMISTRY 10 CORE

Concepts:	Subconcepts:
10.1 The activities of chemical laboratory experimentation require basic skills and knowledge.	10.1.1 Various techniques are used to make qualitative and quantitative observations.
	10.1.2 Safety is of prime importance in the laboratory.
	10.1.3 Laboratory investigations follow a pattern involving such skills as hypothesizing, observing, interpreting, etc.
	10.1.4 The use of graphs in science enables the scientist to relate the variables of an experiment.

10.2	Measurement units are used to describe the properties of matter.	10.2.1	The development of the International System of Units (SI) provided a logical and consistent system of measuring length, mass, time, quantity and temperature.
		10.2.2	The use of significant figures in measurements and calculations is a means of indicating precision.
10.3	Matter is classified in a variety of ways.	10.3.1	Matter is classified on the basis of physical or chemical properties.
		10.3.2	Changes in matter are classified as being physical and/or chemical.
		10.3.3	Matter may be classified as:
		10.3.3.1	Mixtures or pure substances
		10.3.3.2	Homogeneous or heterogeneous
		10.3.3.3	Metals or non metals
		10.3.3.4	Ionic or molecular
10.4	The present atomic theory was developed on the basis of the accumulation of physical and chemical evidence.	10.4.1	Many scientists contributed to the development of modern atomic theory.
		10.4.2	Structure of an atom consists of a dense, positively charged nucleus surrounded by electrons.
		10.4.3	The periodic table is a classification of the elements on the basis of their chemical and physical properties and atomic structure.
10.5	Chemical reactions may be classified and are represented by a chemical language.	10.5.1	IUPAC rules provide a consistent system for naming chemical substances and writing formulas for them.
		10.5.2	The "mole" is a quantity of matter (6.02×10^{23} particles).
		10.5.3	Chemical reactions may be represented by balanced chemical equations.
		10.5.4	Chemical reactions may be classified according to type of reaction.
		10.5.5	The writing and interpretation of balanced chemical reactions are based on the law of Conservation of Mass.
		10.5.6	Chemicals and chemical reactions have many effects: environmental, economic, industrial, etc.

Chemistry 10 Elective Topics

Elective topics are to be chosen from the following list. A minimum of one topic is to be studied.

10.1 Metallurgy

10.2 Chemicals in the Environment

10.3 Chemistry of Soap and Cosmetics

10.4 Chemistry of Photography

10.5 Locally Developed Unit

Note: Outlines for elective topics and a list of recommended resources are provided in the curriculum guide.

CHEMISTRY 20

Objectives of the Chemistry 20 Program:

After participating in the activities and completing the requirements of this course, the student should:

20.1 Know the chemical principles underlying the chemistry specified in the core outline.

20.2 Be skilled in using proper laboratory techniques used by chemists and laboratory personnel.

20.3 Comprehend the historical development of the chemistry principles being studied.

20.4 Have the capacity to apply the knowledge and skills of chemistry to other situations involving chemicals at home and in industry.

20.5 Have interests and attitudes toward chemistry that will assist in the choice of vocations.

20.6 Know the chemistry facts and principles related to the open discussion of social issues of current interest.

Organization of Program:

Approximately 40 hours of instructional time shall be devoted to the core topics and about 25 hours to elective topics. The content of the elective units is to relate to the core in one of three ways:

a. an extensive study of a core topic (breadth)
b. an in-depth, intensive study of a core topic, or
c. a practical application of a core topic.

Prescribed Core References

Ledbetter, E. W. and J. A. Young, *Keys to Chemistry.* Don Mills: Addison-Wesley, 1977

Ledbetter, E. W. and J. A. Young, *Laboratory Keys to Chemistry.* Don Mills: Addison-Wesley, 1977

Gortler, L. B. et al, *keys to Organic Chemistry.* Don Mills: Addison-Wesley, 1977

Jenkins, F. et al, *ALCHEM 20.* Edmonton: J. M. LeBel Enterprises, 1979.

Recommended Core References

Courneya, D. and H. McDonald, *The Nature of Matter.* Toronto: D. C. Heath and Company, 1976

Whitman, R. L. and E. E. Zinck, *Chemistry Today.* Scarborough: Prentice-Hall, Canada, 1976

IAC Modules:
Atkinson, G. and H. Heikkinen, *Reactions and Reason*
Huheey, J., *Diversity and Periodicity*
DeVoe, II., *Communities of Molecules*
Jarvis, B. and P. Mazzocchi, *Form and Function*
Don Mills: Fitzhenry and Whiteside (Harper & Row), 1973

Solutions

Concepts:	Subconcepts:
20.1 Solutions are mixtures.	20.1.1 Solutions are homogeneous mixtures of solute(s) and a solvent. 20.1.2 Solutions may be composed of combinations of solids, liquids and gases.
20.2 Formation of aqueous solutions is a chemical reaction.	20.2.1 Aqueous solutions play a very important part in chemistry. 20.2.2 The dissolving of a solute in a solvent may result in ions, or molecules in solution, and energy changes. 20.2.3 Solutions may be classified as electrolytes or non electrolytes.
20.3 The proportion of solute to solvent is represented by the concentration.	20.3.1 Concentration of solutions is defined in terms of moles of solute per litre of solution, or moles of solute per cubic metre of solution. 20.3.2 Concentration and changes in concentration in solutions can be determined mathematically. 20.3.3 Solutions may be described as unsaturated, saturated, or supersaturated. 20.3.4 Solubility is the concentration of a solute in a saturated solution in equilibrium condition. 20.3.5 Factors that affect solubility are nature of solute and solvent, temperature and pressure.

Bonding

Concepts:	Subconcepts:
20.4 Chemical substances exist as elements bonded together.	20.4.1 Chemical bonds may be covalent or ionic. 20.4.2 Molecules formed by covalent bonds may be polar or nonpolar. 20.4.3 Bonding between molecules may be classified as dipole-dipole, or hydrogen bonding.

Concepts:		Subconcepts:	
20.5	Organic chemistry can be termed "Carbon Chemistry"	20.5.1	The carbon to carbon bonding results in a great variety of compounds.
		20.5.2	Carbon compounds are some of the most important substances on earth.
20.6	Hydrocarbon compounds form an important group of chemicals.	20.6.1	Hydrocarbons may be classified structurally as aliphatic or aromatic.
		20.6.2	The chemical and physical properties of hydrocarbons are the result of their structure and composition.
		20.6.3	Hydrocarbon reactions can be classified as combustion, substitution, and addition.
		20.6.4	The hydrocarbons form an important base for industry in Alberta.
20.7	Hydrocarbon derivatives form another important group of chemicals.	20.7.1	Major derivatives of hydrocarbons are alcohols, carboxylic acids, and esters.
		20.7.2	The chemical and physical properties of these derivative compounds are the result of their structure and composition.

Chemistry 20 Elective Topics
Elective topics are to be chosen from the following list. A minimum of one topic is to be studied.

20.1 Chemistry of the Car

20.2 Environmental Chemistry

20.3 Polymers: Long Chain Molecules

20.4 Biochemistry

20.5 Qualitative Analysis

20.6 Locally Developed Unit

Note: Outlines for elective topics and recommended resources are provided in the curriculum guide.

CHEMISTRY 30

Objectives of the Chemistry 30 Program:

After participating in the activities and completing the requirements of this course, the student should:

30.1 Know the facts and principles of chemistry as specified by the core outline.

30.2 Have competence in using the processes and techniques of chemistry in the identification of problems and the testing of proposed answers.

30.3 Be aware of the chemical factors related to issues of current interest.

30.4 Be informed about vocational and career opportunities in chemical and technical fields.

30.5 Know the contributions that various investigators have made in the development of current chemical theories.

30.6 Understand the application of the concepts and principles learned in class to the production and use of such products as ethylene, gasoline, plastics, fertilizers, pesticides and foods.

Organization of Program:

Approximately 75 hours of instructional time shall be devoted to the core topics and about 45 hours to elective topics. The content of the elective units is to relate to the core in one of three ways:

a. an extensive study of a core topic (breadth)
b. an in-depth, intensive study of a core topic, or
c. a practical application of a core topic.

Prescribed Core References

O'Connor, P. R. et al, *Chemistry: Experiments and Principles.* Toronto: D. C. Heath, 1977

Davis, J. E. et al, *Laboratory Manual for Chemistry: Experiments and Principles.* Toronto: D. C. Heath, 1977

Jenkins, F. et al, *ALCHEM 30.* Edmonton: J. M. LeBel Enterprises, 1979.

or for Acid Base section:

Richardson, R. A., *Proton Chemistry: the Reactions of Acids and Bases.* Rexdale: Wiley and Son, 1976

Recommended Core References

Parry, R. W. et al, *Chemistry: Experimental Foundations.* Second Edition. Scarborough: Prentice-Hall, 1975

Metcalfe, H. C. et al, *Modern Chemistry.* Toronto: Holt, Rinehart and Winston, 1974

Young, J. A. and E. W. Ledbetter, *Keys to Oxidation-Reduction.* Don Mills: Addison-Wesley, 1974

National Science Curriculum Materials Project:
Slattery, R. T., *Acids and Bases*
Langrehr, J. S., *Oxidation and Reduction*
Doherty, J. P., *Energy in Chemical Reactions*
Agincourt: Gage and Co., 1975

IAC Modules
Gordon, G., *The Delicate Balance*
Martin, D. and J. Sampugna, *Molecules in Living Systems.*
Don Mills: Fitzhenry and Whiteside (Harper and Row), 1973

TOPICAL OUTLINE OF CHEMISTRY 30 CORE

Chemical Energetics

Concepts:		Subconcepts:	
30.1	Each substance has a definite and characteristic heat content or enthalpy.	30.1.1	The enthalpy of a substance is the sum of the kinetic and potential energy of the molecules.
		30.1.2	The heat of formation is the energy required or released as a substance is formed from its elements.
30.2	Changes in matter involve a change in energy.	30.2.1	Changes that require energy are endothermic and those that release energy are exothermic.
		30.2.2	More energy is involved in nuclear changes than in chemical changes, and in general more energy is involved in chemical changes than in phase changes.
		30.2.3	In a phase, chemical, or nuclear change, the change in energy is the energy of the products less the energy of reactants.
		30.2.4	The $\triangle H$ of chemical and phase changes is determined calorimetrically.
		30.2.5	By addition of $\triangle H$ values for known reactions, $\triangle H$ values for new reactions can be predicted.
		30.2.6	The amount of energy released or absorbed in a phase, chemical or nuclear change is related to the number of moles of reactants.

Acids and Bases

Concepts:		Subconcepts:	
30.3	Acids and bases can be defined in different ways.	30.3.1	Acids taste sour, change the color of indicators, etc. Bases taste bitter, change the color of indicators, etc.
		30.3.2	Acids neutralize bases.
		30.3.3	Arrhenius defined acids as those substances that increase the H_30+ (aq) concentration and bases as those that increase the $OH-$ (aq) concentration.
		30.3.4	Bronsted and Lowry defined acids as proton donors and bases as proton acceptors.
30.4	The relative acidity of a solution can be measured.	30.4.1	The strengths of acids and bases vary and are measures of the equilibrium condition.
		30.4.2	The pH scale is a measure of the H_30+ (aq) concentration.
		30.4.3	Indicator color may be used to determine pH.

30.3 Electro-Magnetic Radiation

- 30.3.1 Electromagnetic Theory
- 30.3.2 Propagation of Electromagnetic Waves
- 30.3.3 Evidence for Electromagnetic Waves
- 30.3.4 The Electromagnetic Spectrum
- 30.3.5 The Ether Concept

30.4 The Structure of Matter

- 30.4.1 Chemical Nature of the Atom
- 30.4.2 Electrical Nature of the Atom
- 30.4.3 Quantum Behavior of Matter
- 30.4.4 Rutherford - Bohr Model of the Atom
- 30.4.5 Inadequacies of Atomic Models

30.5 Modern Physical Theories

- 30.5.1 Some Results of Relativity
- 30.5.2 Particle-Like Behavior of Radiation
- 30.5.3 Wave-Like Behavior of Particles
- 30.5.4 Significance of Mathematical Atomic Model
- 30.5.5 Heisenberg's Uncertainty Principle
- 30.5.6 Probability Interpretation of Quantum Mechanics

Elective Topics

Elective topics must be chosen from the following list. A minimum of two topics must be studied.

30.1 Geometric Optics

30.2 Optical Instruments

30.3 Kinetic Theory of Matter II

30.4 Special Relativity

30.5 Alternating Current

30.6 Electrical Circuits

30.7 Equilibrium

30.8 Meters, Motors and Generators

30.9 The Speed of Light

30.10 Trajectories and Orbits

30.11 Energy Measurement

30.12 A Locally Developed Unit

Note: Outlines for each elective, with the exception of 30.12, are provided in the Curriculum Guide along with a list of references and resource materials.

Prescribed Core References

Rutherford, F. J., et al, *Project Physics: Text/Handbook Unit 4, Light and Electromagnetism.* New York: Holt, Rinehart and Winston, Inc.

Rutherford, F. J., et al, *Project Physics: Text/Handbook Unit 5, Models of the Atom.* New York: Holt, Rinehart and Winston, Inc., 1975

Introductory Statement

Science 11, as a program, should continue to emphasize skills, concepts, attitudes, humanistic and social implications of science which have been developed for the elementary and junior high school grades.

In this course, content is significant only to the degree that it provides for the realization of other objectives of the course. Student interest should be a significant criterion in the selection of learning experiences.

Major Objectives of Science 11

1. To enhance the student's self-image and develop a positive attitude toward science. The student should:

   a) pursue areas of personal interest
   b) participate in activities in which he/she can experience success.

2. To develop a critical understanding of some current social problems which have a significant scientific component in terms of their cause and/or their solution. The students might study problems such as:

   a) depletion of natural resources
   b) pollution of water and air
   c) over population
   d) improper use of chemicals
   e) science for the consumer.

3. To help students appreciate the scope of science. That is, the student should:

   a) recognize that science is a basic part of modern living
   b) recognize that science involves both inquiry processes and conceptual patterns
   c) recognize the interaction of science, the arts and the humanities
   d) recognize that the achievements of science and technology, properly used, are basic to the advancement of human welfare.

Rationale for the Science 11 Program

Student involvement in Science 11 should lead to successful experiences in learning and studying in various fields of science. During this course, it is hoped that students, as a result of their successful experiences, will develop an attitude which allows them to realize the changes in their lives which science brings about.

It is understood that the students taking Science 11 will have, in relation to science, a wide range of attitudes, interests, abilities, backgrounds, experiences, and knowledge. In order to assist teachers of these students in selecting relevant materials for their students, a wide range of resources for classroom use has been identified. These resources, however, are not meant to be restrictive and teachers should feel free to supplement them.

Prescribed Resource Materials

1. Heimler, C. H. et al. *Principles of Science,* Book 2, Fourth Edition, Charles E. Merrill Publishing Co., 1979.
2. Kaskel, A. et al. *Principles of Science, Book 2 "A Learning Strategy for the Laboratory",* Charles E. Merrill Publishing Co., 1979.
3. *Individual Science Instructional System* (I.S.I.S.) Ginn & Co. 1976-81. — Selected Titles. Please refer to School Book Branch catalogue for listing and prices.

*For a sample activity unit and student projects refer to the Science 11 Curriculum Guide, 1971. For a more extensive listing of activity units and student projects (with references) refer to the special School Book Branch publication entitled *Science Activity Units and Projects* (Teacher reference only).

PHYSICS 22

Physics 22 is designed for students in Vocational High schools who are taking programs which articulate with the Institutes of Technology, e.g., Drafting, Electronics, Machine Shop. It is expected that students in other programs may elect this course. Teachers should feel free to adjust the content and method of presentation to the capabilities of their classes; however, it is felt that students in the articulated programs should substantially cover the program as outlined:

Texts

White. *Physics, An Exact Science.*
White. *Laboratory Exercises to Accompany Physics, An Exact Science.*
or
White. *Physics, An Experimental Science.*
White: *Laboratory Exercises to Accompany Physics, An Experimental Science.*

Course Outline

1. Introduction — Lessons 3, 4*.
2. Properties of Matter — Lessons 4, 5*, 6, 7*.
3. Light — Lessons 1, 2, 3*, 4, 5*, 6, 7, 8*, 9, 10*, 11, 12, 13*, 14, 15*.

* The lessons which are marked with an asterisk are laboratory exercises.

** Please note that the course has **not** been revised and teachers using *Physics, An Experimental Science* should choose the equivalent lessons to those found in *Physics, An Exact Science.*

PHYSICS 32

As for Physics 22, Physics 32 is designed for students in Vocational High Schools who are taking programs which articulate with the Institutes of Technology and is expected to be equivalent to the Year "A" Physics program in the technical institutes. Information on course content and laboratory exercises follows:

Texts

White. *Physics, An Exact Science.*
White. *Laboratory Exercises to Accompany Physics, An Exact Science.*
or
White. *Physics, An Experimental Science.*
White: *Laboratory Exercises to Accompany Physics, An Experimental Science.*

Course Outline

1. Mechanics
   Lessons 1, 2*, 3, 4*, 5, 6, 7, 8*, 9, 10, 11*, 12, 13*, 14, 15, 16*, 17, 18*, 19, 21, 23, 24, 27, 29, 30*, 31, 32, 33*.

2. Electricity
   Lessons 1, 2, 3, 4*, 5, 6*, 7, 9.

3. Heat
   Lessons 1, 3, 7*, 8, 9, 11, 12*.

* The lessons which are marked with an asterisk are laboratory experiments.

** Please note that the course has **not** been revised and teachers using *Physics, An Experimental Science* should choose the equivalent lessons to those found in *Physics, An Exact Science.*

B. Value Objectives

Values are basic or fundamental ideas about what is important in life; they are standards of conduct which cause individuals, groups and nations to think and act in certain ways.

For all topics in the Alberta Social Studies Curriculum, prescribed value objectives encompass three aspects of student development.

- Development of understanding of distinctive human values.
- Development of competencies in processes of value analysis, decision-making, and moral reasoning.
- Development of positive attitudes towards self, others and the environment.

C. Knowledge Objectives

To be an effective citizen, one needs to be informed. Only by knowing their world can people exercise even partial control of that world. Because the pool of knowledge is always growing and changing, effective citizens must have both the commitment and the skills to modify and extend their knowledge continuously.

Prescribed knowledge objectives for social studies topics encompass three levels of organization: facts, concepts, and generalizations. Prescribed concepts and generalizations tend to reflect broad human processes and relationships. Prescribed factual knowledge, by contrast, tends to be drawn directly from history, geography or the social science disciplines. Facts that are prescribed for grade level topics are identified within the structure of a question format entitled **Questions to Guide Inquiry.** In formulating the "Questions to Guide Inquiry" component of knowledge objectives for grade level topics, care has been taken to ensure that significant factual information will be attained by students, and a variety of levels of thinking processes encompassed.

The process of developing, testing and substantiating (or falsifying) generalizations is amongst the most important qualities of true inquiry. The Alberta Social Studies Curriculum emphasizes the place of generalizations in the structure of knowledge, and the importance of students developing their own generalizations from concepts and factual information.

D. Skill Objectives

Skill objectives for the Alberta Social Studies Curriculum include both inquiry and participation skills. Inquiry skills encompass eight "areas" of research, representing the major steps in a generalized model of social inquiry. This model can be expanded or modified in numerous creative ways to suit specific topics, disciplinary emphases, resources and student maturity. Participation skills comprise four "areas" of skills and can be developed throughout the process of inquiry.

Within each topic, some skill areas are emphasized (those in standard type). Skills listed in italics may be given less emphasis for that topic. It should be noted that each area of skill objectives is prescribed for emphasis at least once for each grade.

INQUIRY SKILLS

Skill Area One: IDENTIFY AND FOCUS ON THE ISSUE

- Identify the elements of the social issue (e.g., value, factual, definitional, policy elements and competing values)
- Describe the social issue in terms meaningful to students
- Paraphrase the issue from different sources, or expressions of opinion

Skill Area Two: ESTABLISH RESEARCH QUESTIONS AND PROCEDURES

- Hypothesize possible solutions
- Formulate appropriate research questions to guide information gathering
- Select appropriate techniques and resources for research

Skill Area Three: GATHER AND ORGANIZE DATA

- Read and interpret:
  - print materials (contemporary and historical)
  - maps and globes
  - graphs
  - tables
  - charts and timelines
- Interview
- Survey
- Observe and listen to:
  - individuals and groups of people
  - audiovisual materials
- Conduct participant observation
- Record by:
  - outlining
  - paraphrasing
  - tabulating
  - mapping
  - charting (retrieval, etc.)
  - diagramming
  - sketching and painting
  - graphing
  - note making

Skill Area Four: ANALYZE AND EVALUATE DATA

- Categorize data
- Compare and contrast data
- Explain discrepancies in viewpoints, positions and arguments
- Evaluate bias and emotionalism, subjectivity and objectivity
- Infer reasons for varying perspectives
- Discriminate relevant from irrelevant data

Skill Area Five: SYNTHESIZE DATA

- Develop concepts
- Formulate generalizations
- Relate causes and effects
- Summarize information

Skill Area Six: RESOLVE THE ISSUE

- Formulate alternative solutions
- Analyze values underlying each alternative
- Predict the consequences of each alternative
- Evaluate alternatives and make a policy decision based on:
  - adequacy of supporting evidence
  - logical consistency of arguments
  - priority of personal values
  - priority of social values

Skill Area Seven: APPLY THE DECISION

To help students develop skills in active civic participation, it is desirable to have them become involved in some form of real life application of the decision reached.

While the concept of active involvement is encouraged as a significant aspect of education for active citizenship, the role of the teacher in helping students organize and implement social action projects is one requiring a strong sense of responsibility. It requires sensitivity to the maturity of students, to the expectations of parents, to institutional norms, and to democratic processes. Because of the need for sensitivity in carrying out this type of learning experience, social action is not prescribed but is encouraged where possible, given the above cautions.

Therefore, skills prescribed for grade level topics incorporate criteria for planning to apply decisions, but do not prescribe social action strategies or situations.

Specifically, as students and teachers consider whether to implement the action component of the Alberta Social Studies Curriculum, they should:

- Consider the feasibility and desirability of applying the decision in some form of action
- Create a plan of action to apply the decision (e.g., work for an improved school or classroom environment; provide services to a community group on a close interpersonal basis; express ideas in social settings, or participate actively in a political process). In particular, students should be encouraged to regard their school as a real and viable social institution and to find ways to improve school life.
- Apply the plan (if feasible and desirable):
  - in the classroom
  - in the school
  - in the broader community

Skill Area Eight: EVALUATE THE DECISION AND THE PROCESS

- Judge the worthwhileness of the consequences of the decision:
  - to self
  - to others
- Examine the appropriateness of the action
- Assess the suitability of the process to the issue and resources
- Decide whether to culminate inquiry, or to continue it.

PARTICIPATION SKILLS

In a complex, democratic society it is desirable for citizens to become competent in working with others to resolve social issues and to implement decisions they have reached. Working together depends upon competence in several kinds of skills, including those outlined below.

Skill Area One: COMMUNICATE EFFECTIVELY

- — Express ideas clearly and succinctly, orally and in writing
- — Support ideas logically
- — Adapt a communication on the basis of:
  size of audience (e.g., individual, small group, class or community)
  age of audience
  purpose of message (e.g., formal or informal)

Skill Area Two: INTERPRET IDEAS AND FEELINGS OF SELF AND OTHERS

- — Listen to the expression of ideas and feelings of others
- — Understand and empathize with the dilemmas and decisions of others
- — Interpret feelings from verbal and non-verbal cues

Skill Area Three: PARTICIPATE IN GROUP WORK AND DECISION-MAKING

- — Choose an appropriate model for decision-making in class and small group situations (e.g., consensus, majority rule, authority) and apply appropriate rules for procedure
- — Apply alternate roles as leader or follower in a group
- — Prepare a position in understandable and persuasive terms
- — Organize activities to promote group goals
- — Negotiate (including bargain, trade, confront, compromise) to influence others to a certain position, or to build consensus
- — Provide support in furthering group goals

Skill Area Four: CONTRIBUTE TO A "SENSE OF COMMUNITY"

- — Demonstrate a sense of sharing of group goals and aspirations
- — Assist in group projects, both in and outside the classroom, to help others achieve a sense of belonging and mutual trust
- — Take steps to establish cross-age, cross-cultural, cross-sex, etc., relationships both in and outside the classroom.

III. MINIMUM EXPECTATIONS

Core/Elective Components

Like other subjects in Alberta schools, social studies has core and elective components.

The mandatory core comprises 75% of the program and is represented by the topics and statements of objectives that follow. The elective portion occupies 25% of the program. Topics and issues for the elective portion are to be chosen by teachers and students, preferably in consultation with parents and

community groups and agencies. Elective topics should help students develop an understanding of current concerns at local, provincial, national and international levels.

IV. LEARNING RESOURCES

1. Prescribed Learning Resources:

Three to ten print and/or non-print resources have been prescribed for social studies instruction at each grade level.

The prescribed resources are those resources that Alberta Education has assessed as the best presently available for achieving the objectives of grade level social studies programs. These resources are listed in the documents below and are available for purchase at a 40% discount at the Alberta School Book Branch.

— *Alberta School Book Branch Catalogue*
— *Social Studies Learning Resources for Elementary Schools*
— *Social Studies Learning Resources for Secondary Schools*

Resources, once prescribed, retain this status for a minimum of three years.

2. Recommended Learning Resources:

Recommended resources include print and/or non-print materials which contribute to one or more social studies objectives, as well as curriculum materials which are complementary to prescribed resources (e.g., teachers' guides). These resources are listed in the documents named above and are available from the Alberta School Book Branch.

WHAT IS PRESCRIBED IN ALBERTA SOCIAL STUDIES: A SUMMARY

1. Three (3) topics for each of Grades One through Ten and two (2) topics for each of Grades Eleven and Twelve are **prescribed** for study.
2. One social issue per curriculum topic is **prescribed** for inquiry. Teachers are encouraged to **modify** specific issues so long as the general intent and meaning are preserved.
3. Value objectives, knowledge objectives and skill objectives are **prescribed** for each topic.
4. The model of social inquiry should be viewed as a flexible process and is **not prescribed.** Rather, the model should be expanded or modified by teachers to reflect the needs of individual students and classrooms. Availability of resources and disciplinary emphasis of the topic will also affect the particular approach to inquiry in which teachers and students engage in social studies.
5. Social action is not **prescribed** but is **encouraged** where possible and when desirable/feasible.
6. The mandatory **core** comprises 75% of the program and is represented by the 34 topics and the statements of objectives. The optional **elective** portion comprises up to 25% of the program.
7. **Prescribed** learning resources are those listed in these documents for 1981-82: *Alberta School Book Branch Catalogue, Social Studies Learning*

Resources for Elementary Schools and Social Studies Learning Resources for Secondary Schools.

NOTE: Prescribed resources have been identified as being the most suitable for facilitating the attainment of a **majority** of prescribed objectives for a specific topic. They are identified as being the best resources presently available for the 1981 Alberta Social Studies Curriculum.

Recommended learning resources are also listed in the documents named above. These curriculum materials are complementary to prescribed resources. As such, these resources may be used to facilitate the attainment of **some** of the prescribed objectives.

The choice of which particular resources are to be obtained, and how they will be used, is basically a local decision. Teachers may supplement all resources with additional materials identified at the local level. Section 12(2)b of the School Act states that such materials must be approved by the school board.

Resources that are prescribed for use with the Alberta Social Studies Curriculum are as follows:

Grade & Topic	Title and Author	Publisher
10A	*Human Rights: Respecting Our Differences* — McCarthy, McGuckin, Ripley, Schoenrock et al	Alberta Human Rights Commission
10B/C	*Canada's Century* — Evans, Martinello	McGraw-Hill Ryerson
10B/C	*In Search of Canada — Volume II* — Kirbyson	Prentice-Hall of Canada
10A/ B/C	*Canada Today* — McDevitt, Scully, Smith	Prentice-Hall of Canada
11A	Viewpoints in World History Series- Feder, *Was There Really A Renaissance? What Were The Causes of the Protestant Reformation? What Forces Guided the French Revolution?*	Van Nostrand Reinhold Ltd.
11A/B	*Our Western Heritage, Units 1 - 4* — Roselle, Young	Ginn and Company
11A/B	*The Shaping of Western Society* (Kit and Text) Fenton, Good, Rosenzweig, Gregory	Holt, Rinehart and Winston
11B	*Challenge for Change: Geographical Approach to Selected World Issues* — Fagan, Andrews	McGraw-Hill Ryerson
11B	*Environmental Concerns, The World* — Sweeney	Harcourt Brace Jovanovich, Inc.
11B	*World Prospects* — Molyneux, Olsen	Prentice-Hall of Canada

12A/B	*Our Western Heritage — Units 5 - 9* — Roselle, Young	Ginn and Company
12A/B	*Modern Perspectives* — Trueman, Schaffter, Stewart, Hunter	McGraw-Hill Ryerson Ltd.
12A/B	Viewpoints in World History Series- Feder, *What Were the Causes of World War I? How Did the Communists Seize Power in Russia? The Rise of the Nazi Horror: Who Was Responsible? The Nuclear Arsenals: Security or Suicide? The United Nations: Man's Best Hope for Peace*	Van Nostrand Reinhold Ltd.
12B	*The Contemporary World: Conflict or Cooperation?* Cannon, Clark, Smuga	Oliver & Boyd
12B	*War and War Prevention* — Moore	Hayden Book Company Inc.
12B	*Why Nations Go To War* — Stoessinger	Macmillan Company of Canada

GRADE TEN
PARTICIPATORY CITIZENSHIP

TOPIC A: HUMAN RIGHTS IN CANADA

In this topic, students examine Canadian issues involving the competing values of individual freedom and social control. Themes should focus on contemporary and historical concerns such as: freedom of speech (War Measures Act 1970), protection against arbitrary, prejudicial or discriminatory actions by others (Human Rights Commission and Canadian Bill of Rights), language rights (Manitoba School Act), Canadian participation in international human rights movements (Amnesty International), and the role of government at various levels in relation to human rights issues.

Inquiry into this topic should provide students with opportunities to make judgments about their individual responsibilities in protecting the human rights of themselves and others.

Competing Values and Social Issue

Individual Freedom/Social Control
To what extent should governments limit personal freedom in order to maintain social control?

VALUE OBJECTIVES	KNOWLEDGE OBJECTIVES	SKILL OBJECTIVES
Students will examine the social issue in order to develop the following understandings, competencies, and attitudes. (*Questions in italicized print are illustrative only.*)	Students will gain understanding of the following generalization and concepts, as well as factual information appropriate to the inquiry questions that are listed.	Students will develop competence in the following inquiry and participation skills. Skills printed in standard type are emphasized for this topic.
1. Develop Understanding of Values 1. Identify personal experiences in which values of individual freedom have conflicted with those of social control. — *What experience have you had involving conflict between individual freedom and social control (personal and immediate as well as abstract and distant)?* 2. Describe situations involving conflict between individual freedom and social control in Canadian history. — *How do situations in everyday life involve conflict between freedom and control? How do selected historical Canadian events reflect such a conflict?* **2. Develop Competencies** 1. In value analysis, by assessing the degree of logical consistency in one's reactions to a variety of freedom/control conflicts.	**1. Generalization** All societies have systems of social control. Conflicts arise between values of personal freedom and social control when both are sought. **2. Concepts** 1. Justice 2. Citizenship 3. Government 4. Freedom 5. Social control **3. Questions to Guide Inquiry** 1. What are human rights? Which of these exist in Canada today? Do all Canadians have the same human rights? 2. What are the responsibilities of government in maintaining the personal freedom of its citizens? What are some responsibilities of individual citizens to Canadian society?	**1. Develop Inquiry Skills** 1. *Identify and focus on the issue by describing situations and/or historical episodes in which individual freedom is/was in conflict with social control.* 2. Formulate research questions and hypotheses for case studies of conflict between individual freedom and social control in Canadian history. 3. Gather and organize data by — reading about, or listening to, firsthand accounts of perceived violations of human rights. — observing and listening to audiovisual material to gain perspectives on human rights issues in Canadian history. — observing and listening to audiovisual materials to gain perspectives on human rights issues in other countries. 4. Analyze and evaluate data by identifying discrepancies in the accounts of participants and observers in human rights case studies.

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